SHARP SERVICE MANUAL

DIGITAL FULL COLOR
MULTIFUNCTIONAL SYSTEM
OPTION
INSERTER

MODEL **MX-CFX1**

CONTENTS

Parts marked with " ⚠ " are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

SHARP CORPORATION

CONTENTS

[1] PRODUCT OUTLINE

This inserter is an optional unit for the MX-5500N/MX-6200N/MX-7000N series of digital complex machines. With the inserter installed, blank sheets or printed sheets can be inserted as covers (made of cardboard) or tabbed sheets without being subject to the printing process (and without passing through a fixing unit). When the inserter is combined with a finisher (optional) and a punch unit (optional), printed sheets can proceed to the hole punching or stapling process without being subject to the copying process (or without passing through the main unit).

MX-CFX1
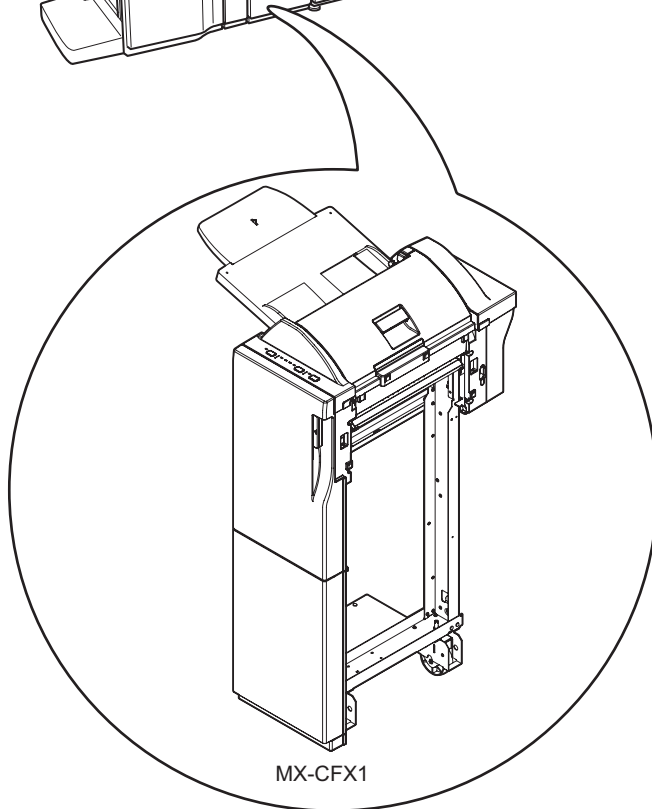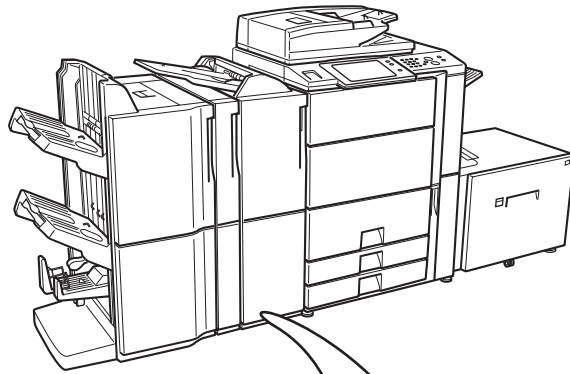
[2] SPECIFICATIONS

1. Basic specifications

Name	Inserter
Type	Floor standing
Transport reference	Center reference
Productivity	Single-sided: 36 cpm, double-sided: 25 cpm (when A4 size 8.5x11 paper is fed continuously)
Loading capacity	100 sheets max. (standard paper: 80g/m^2)
Paper size/weight	Refer to Table 1 ("Paper size/weight")
Offline function — Mode	Stapling, saddle stitch, punching
Offline function — Paper size/weight	As for the paper size/weight in each mode, rules for each mode shown in "Exit paper size/weight (finisher)" should be observed.
Reliability	MCBJ: Conforms to the main unit MCBF: Conforms to the main unit
Life	Conforms to the main unit
Power supply	Supplied from the finisher
External dimensions (WxDxHmm)	455x595x1050mm, 17 59/64x23 27/64x41 21/64 inch
Product dimensions (WxDmm)	565x595mm, 22 1/4x23 27/64 inch
Weight	Approx. 23kg, 50.7lbs

Table 1:Paper size/weight

		Capacity of paper that can be exited	Offset	Capacity of paper that can be stapled	Saddle stitch	Punching, 2-holes	Punching, 3-holes	Punching, 4-holes	Punching, 4-holes, wide	Inserter paper feed
Paper size	A3W	Yes	No	No	No	No	No	No	No	Yes
	A3	Yes	Yes	30	Yes	Yes	Yes	Yes	Yes	Yes
	B4	Yes	Yes	30	Yes	Yes	No	No	Yes	Yes
	A4	Yes	Yes	50	No	Yes	Yes	Yes	Yes	Yes
	A4R	Yes	Yes	30	Yes	Yes	No	No	Yes	Yes
	B5	Yes	Yes	50	No	Yes	No	No	Yes	Yes
	B5R	Yes	No	No	No	Yes	No	No	Yes	Yes
	A5R	Yes	No	No	No	No	No	No	No	Yes
	12x18	Yes	No	No	No	No	No	No	No	Yes
	11x17	Yes	Yes	30	Yes	Yes	Yes	Yes	Yes	Yes
	8.5x14	Yes	Yes	30	Yes	Yes	Yes*3	No	Yes	Yes
	8.5x13	Yes	Yes	30	No	Yes	Yes*3	No	Yes	Yes
	8.5x11	Yes	Yes	50	No	Yes	Yes	Yes	Yes	Yes
	8.5x11R	Yes	Yes	30	Yes	Yes	Yes*3	No	Yes	Yes
	7.25x10.5R	Yes	No	No	No	Yes	No	No	Yes	Yes
	5.5x8.5R	Yes	No	No	No	No	No	No	No	Yes
	8K	Yes	Yes	30	Yes	Yes	No	No	No	Yes
	16K	Yes	Yes	50	No	Yes	No	No	No	Yes
	16KR	Yes	No	No	No	Yes	No	No	No	Yes
	Postcard	Yes	No	No	No	No	No	No	No	No
	Envelope	Yes	No	No	No	No	No	No	No	No
	Special	Yes	No	No	No	No	No	No	No	No
Type and weight of paper that can be fed	Thin paper 55-59g/m2 15-16- lbs bond	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Normal paper 60-105g/m2 16-28 lbs bond	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	cardboard 1(including gloss paper) 106-209g/m2 28+-56-lbsbond	Yes	Yes	*1	*2	Yes	Yes	Yes	Yes	Yes
	cardboard 2 210-256g/m2 56-68 lbs bond	Yes	Yes	*1	*2	Yes	Yes	Yes	Yes	Yes
	Envelope 75-90g/m2 20-24 lbs bond	Yes	No	No	No	No	No	No	No	No
	OHP	Yes	No	No	No	No	No	No	No	Yes
	Label paper	Yes	No	No	No	No	No	No	No	No
	Tab paper	Yes	No	No*4	No	Yes*5	Yes*5	Yes*5	Yes*5	Yes

*1) Stapling of 256g/m^2 paper 2 sheets + 80g/m^2 paper 48 sheets is enabled (cardboard is included).

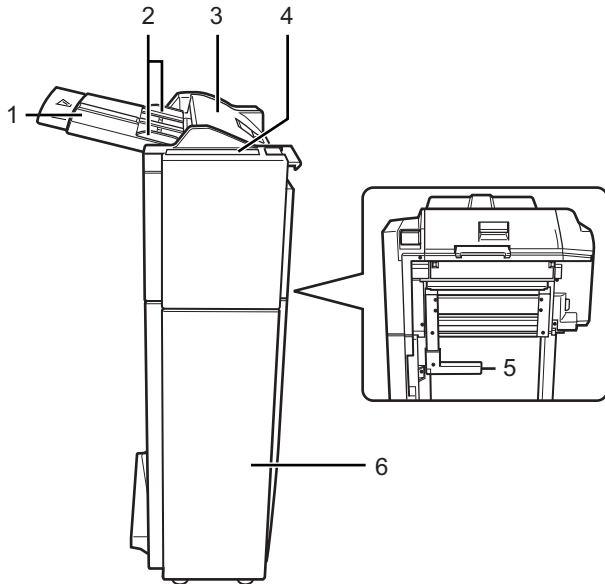*2) Saddle stitch of 256g/m^2 paper 1 sheet + 80g/m^2 paper 14 sheets is enabled (cardboard is included).

*3) Punching 3-holes is automatically changed to 2-holes.

*4) While paper is fed from the inserter, stapling is enabled.

*5) While paper is fed from the inserter, punch operation is enabled.

[4] EXTERNAL VIEWS AND INTERNAL STRUCTURES

1. External components

No.	Description	Function
1	Paper feed tray	Place blank or printed sheets to be inserted in this tray.
2	Paper guide	Adjust this guide according to the paper size.
3	Top cover	Open this cover to clear a paper jam.
4	Operator panel	Used to staple and punch during off-line. (The same operation can be made with the operation panel of the main unit.)
5	Paper guiding section (Lever)	Unlock the paper guiding section to clear a paper jam.
6	Front cover	Open this cover to remove jammed paper from the finisher or saddle finisher.

2. Sensors and switches
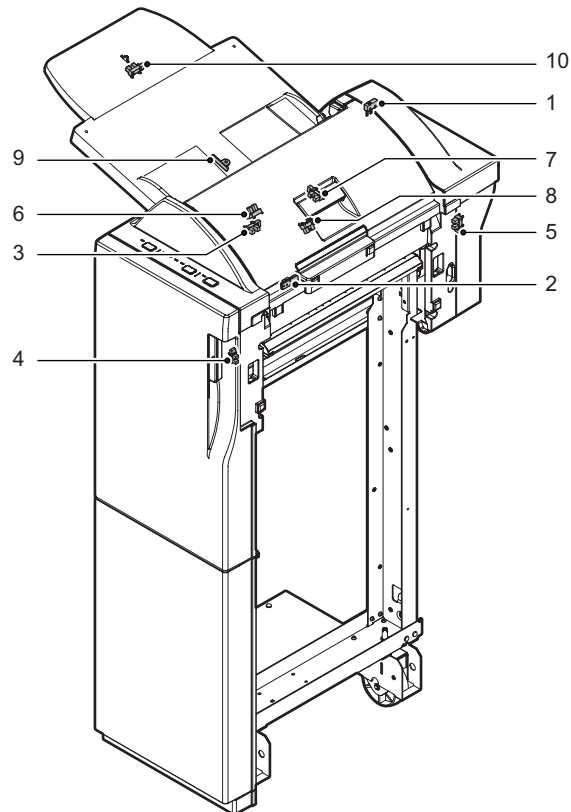
No.	Symbol	Description	Type	Function and operation	Output	Product name (Model)	Manufacturer
1	JCK_S W	JAM cover open/ close switch	Microswitch	Detects that the JAM cover is opened or closed.	When the JAM cover is opened, TP37 turns HIGH.	DE2L-FAAA	HIROSE CHERRY PRECISION

2	H_SEN	Reverse sensor	Reflective sensor	Detects that a sheet to be inserted is transported to the reverse sensor.	When a sheet is detected, TP1 turns HIGH.	SENSOR (SNS - SPI-337-01)	SANYO
3	HI_SEN	Paper exit sensor	Photointerrupter	Detects that a sheet to be inserted is transported to the paper exit sensor.	When a sheet is detected, TP7 turns LOW.	TLP1241 (C5)	TOSHIBA
4	HYK_SEN	Reverse unit open/close sensor	Photointerrupter	Detects that the reverse unit is opened or closed.	When the reverse unit is opened, TP9 turns LOW.	TLP1241 (C5)	TOSHIBA
5	S_SEN	Set sensor	Photointerrupter	Detects that the inserter is joined to the main unit.	When the inserter is joined to the main unit, TP16 turns HIGH.	TLP1241 (C5)	TOSHIBA
6	EMP_SEN	Empty sensor	Photointerrupter	Detects presence/absence of a sheet to be inserted in the paper feed tray.	When a sheet is detected, TP4 turns HIGH.	TLP1241 (C5)	TOSHIBA
7	REG_SEN	Registration sensor	Photointerrupter	Detects that a sheet to be inserted is transported to the registration sensor.	When a sheet is detected, TP5 turns LOW.	TLP1241 (C5)	TOSHIBA
8	TIM_SEN	Timing sensor	Photointerrupter	Detects that a sheet to be inserted is transported to the timing sensor.	When a sheet is detected, TP6 turns LOW.	TLP1241(C5)	TOSHIBA
9	T_VR	Sheet width detection potentiometer	Potentiometer	Detects the width of a sheet to be inserted in the tray.	The voltage of TP12 varies between 0 V and 5 V depending on the sheet width.	RDC505003A	ALPS
10	T_SEN	Tray sensor	Photointerrupter	Detects the length of a sheet to be inserted in the tray	When a sheet is detected, TP13 turns LOW.	GP1A73A	SHARP

3. Motors, solenoid, and clutch
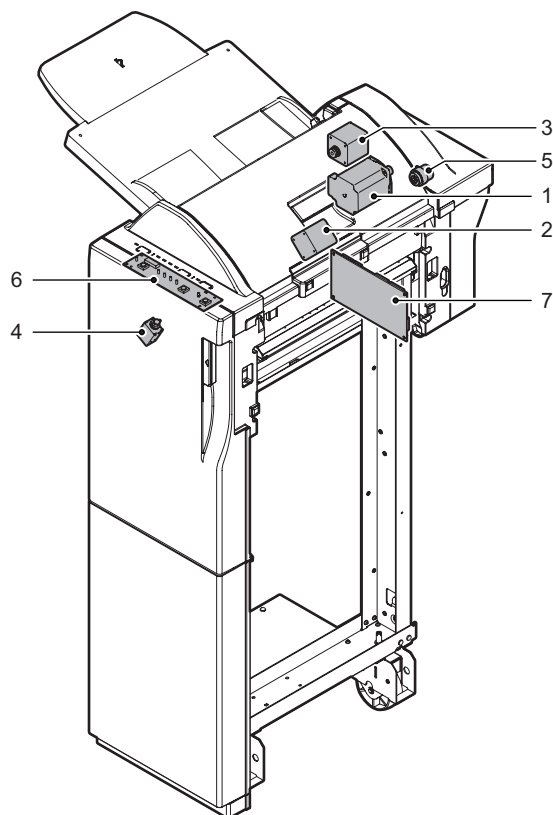
No.	Symbol	Description	Function	Product name (Model)	Manufacturer
1	K_MOT	Paper feed motor	Feeds a sheet to be inserted from the tray.	23KM-K112-P5V	MINEBEA
2	H_MOT	Reverse motor	Reverses and ejects a sheet to be inserted.	17PM-J507-P2VS	MINEBEA
3	Y_MOT	Horizontal transport motor	Transports a sheet to be inserted on the horizontal transport path.	17PM-J507-P3VS	MINEBEA
4	F_SOL	Flapper solenoid	Switches over the flapper in the reversing operation.	TDS-10SL-134	TDS
5	R_CL	Registration clutch	Holds the registration rollers to maintain registration.	BJ-2.6-184	SHINKO
6	PBA-PANEL	Operation panel PWB	-		
7	PBA-CONT	Main control PWB	-		

[5] OPERATIONAL DESCRIPTION

1. Structure

A. Cross-sectional view (Main body)
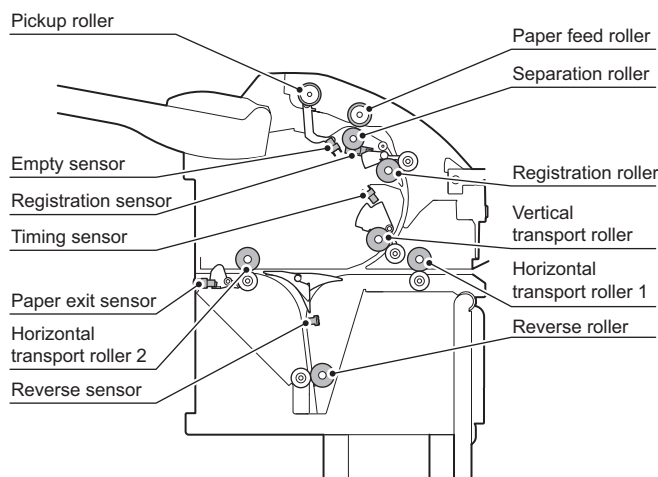
B. Drive system

[List of actuators]

| Actuator		Components to be driven
Description	Type	
Paper feed motor	Pulse motor	Pickup roller, feed rollers, separation rollers, registration rollers, vertical transport rollers
Transport motor	Pulse motor	Inlet rollers (horizontal transport rollers 1), paper exit rollers (horizontal transport rollers 2)
Reverse motor	Pulse motor	Reverse rollers
Reverse flapper solenoid	Solenoid	Switch-over flapper in reverse section
Registration clutch	Electromagnetic clutch	Registration roller lock clutch

2. Function outline

A. Operation mode

1) Normal (online mode)
   • Through (horizontal transport)
   • Straight mode (normal paper feeding from inserter)
   • Reverse mode (reverse paper feeding from inserter)
2) Offline mode
   • Punching mode (inserter operation = normal paper feeding)
   • Stapling mode (inserter operation = normal paper feeding)

B. Delivery speed

1) Delivery speed
   • Straight mode: 627 mm/sec
   • Saddle mode (reverse): 276 mm/sec

3. Operational description

A. Through-mode operation of inserter (Online)
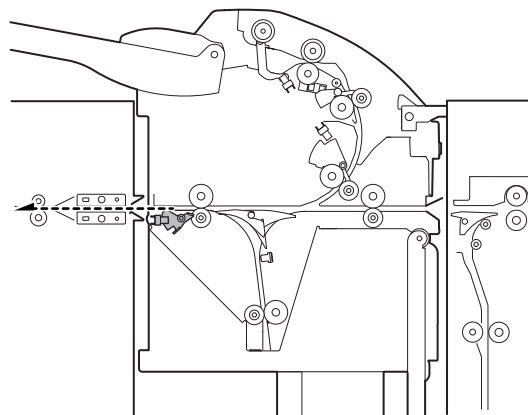
1) The inserter receives an operation command sent by the main unit.
2) The transport motor rotates at a speed specified by the main unit.
   Horizontal transport rollers 1 (inlet rollers) and horizontal transport rollers 2 (paper exit rollers) rotate.
3) A sheet exits from the main unit
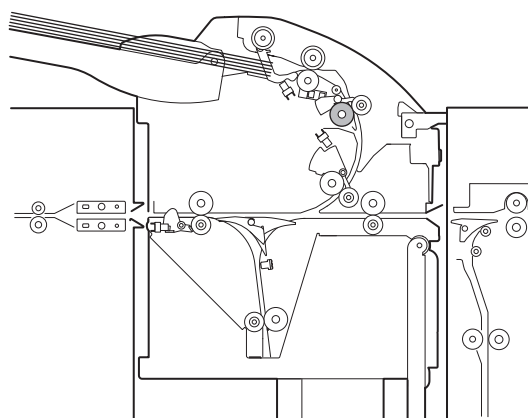
4) The paper exit sensor detects the leading edge of the sheet.
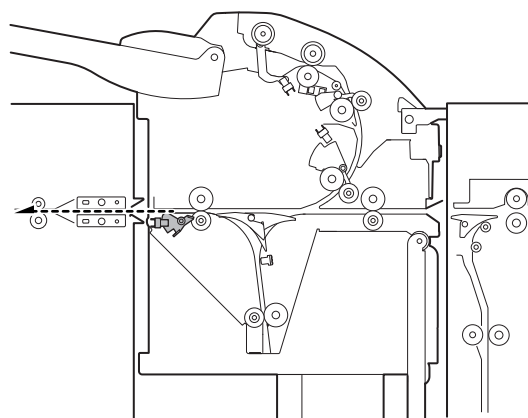
5) The paper exit sensor detects the trailing edge of the sheet.
6) The transport motor stops.
   Horizontal transport rollers 1 and horizontal transport rollers 2 stop.

B. Normal paper feed operation of inserter (online/offline)

[Paper loading]

1) A sheet is placed in the paper feed tray of the inserter.

2) The START LED lights up in blue on the operator panel of the inserter.

3) An operation command is sent by the main unit, or a user presses the START switch on the operator panel of the inserter.

4) The registration clutch is turned ON to lock the registration rollers.
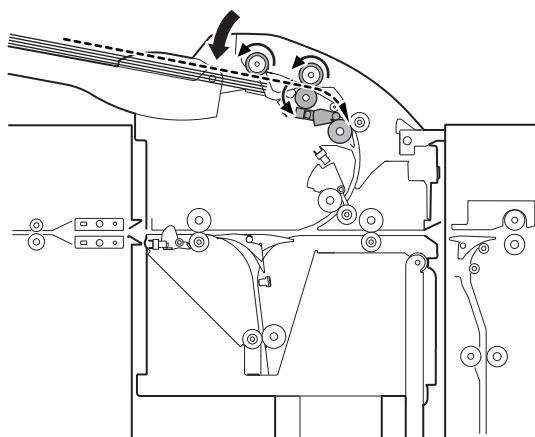
[Separation]

5) The paper feed motor reverses to lower the pickup roller, thereby taking in the sheet from the paper feed tray.

6) The registration sensor detects the leading edge of the sheet.

7) The sheet makes contact with the registration rollers to form a loop, thereby stopping the paper feed motor.

8) The registration clutch is turned OFF.

9) The paper feed motor starts to rotate in the forward direction. The registration rollers and vertical transport rollers rotate.

10) The timing sensor detects the leading edge of the sheet.

11) The leading edge of the sheet passes between the vertical transport rollers.

12) When sheet transport needs to be suspended for adjusting the space between sheets, the paper feed motor stops to stop the sheet.

[Transport]

13) When a predetermined waiting time period has passed, The paper feed motor restarts.

(If the transport motor has stopped, it is started.)

14) The paper exit sensor is turned ON, and detects the leading edge of the sheet.

15) The timing sensor is turned OFF, and the trailing edge of the sheet is detected.

16) When the trailing edge of the sheet leaves the vertical transport rollers, the paper feed motor stops.

(When there is a next sheet to be inserted, the paper feed motor reverses to take it in.)

[Paper exit]
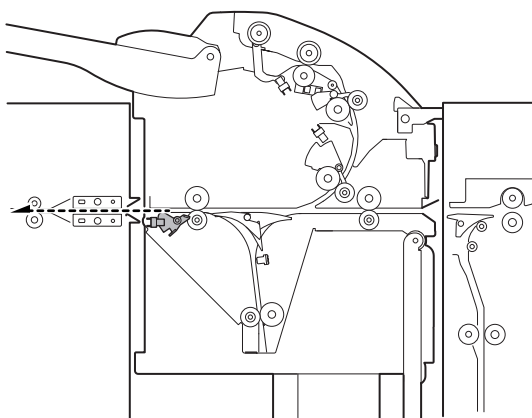
17) The paper exit sensor is turned OFF, and the trailing edge of the sheet is detected.

18) When there is no next sheet to be inserted, the transport motor stops.

NOTE: While the transport motor (horizontal transport rollers 1 and horizontal transport rollers 2) rotates at a speed specified by the main unit in the online mode, it rotates at either of the speeds shown below in the offline mode.

* Transport speed in offline mode

Small-sized sheet (of which length detected in the tray is 216 mm or less): 627 mm/sec

Large-sized sheet (of which length detected in the tray is more than 276 mm): 800 mm/sec

C. Reverse paper feeding operation of inserter

[Paper loading]

1) A sheet is placed in the paper feed tray of the inserter.
2) The START LED lights up in blue on the operator panel of the inserter.
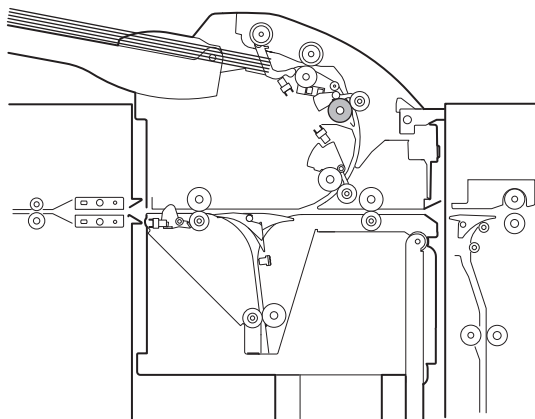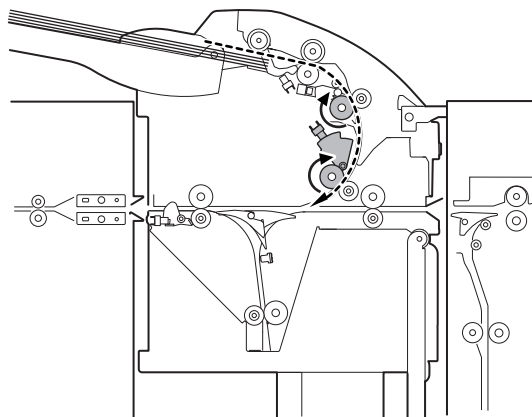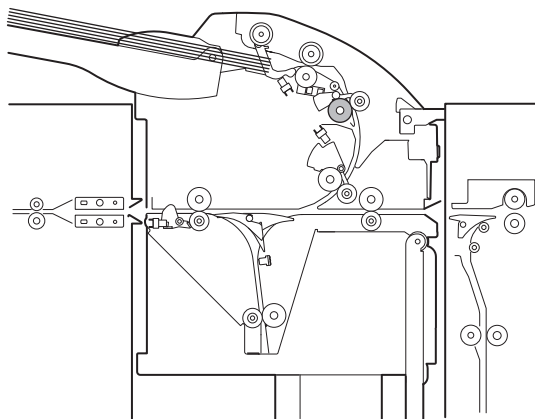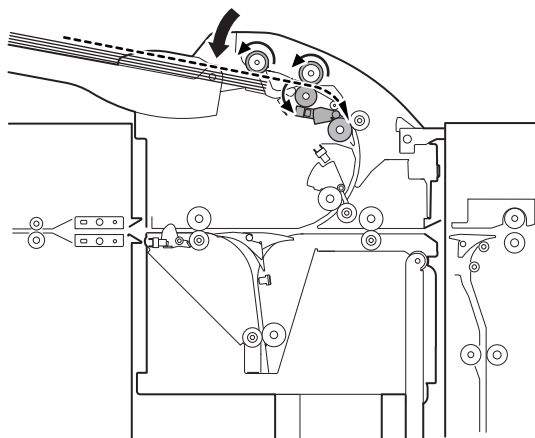3) The inserter reserves an operation command sent by the main unit.
4) The registration clutch is turned ON to lock the registration rollers.

[Separation]

5) The paper feed motor reverses to lower the pickup roller, thereby taking in the sheet from the paper feed tray
6) The registration sensor detects the leading edge of the sheet.
7) The sheet makes contact with the registration rollers to form a loop, thereby stopping the paper feed motor.
8) The registration clutch is turned OFF.

[Leading-edge registration]
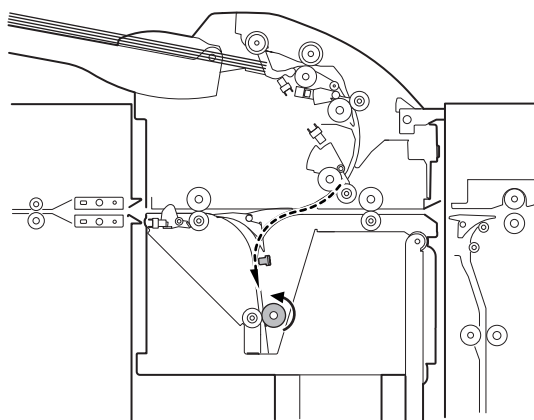
9) The paper feed motor starts to rotate in the forward direction. The registration rollers and vertical transport rollers rotate. If the sheet is the first sheet, the flapper solenoid in the reverse section is turned ON at this point of time.
10) The timing sensor detects the leading edge of the sheet.
11) The leading edge of the sheet passes between the vertical transport rollers
12) When sheet transport needs to be suspended for adjusting the space between sheets, the paper feed motor stops to stop the sheet.

[Entering reverse section]
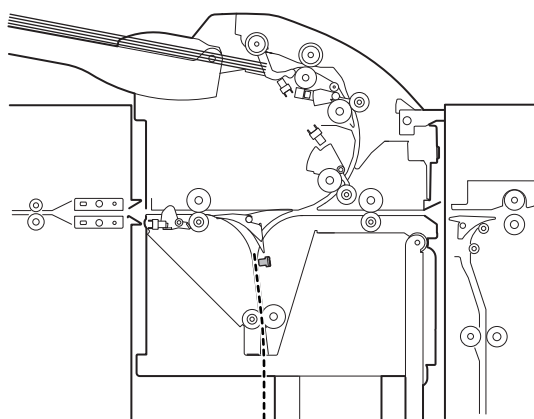
13) When a predetermined waiting time period has passed, the flapper solenoid is turned ON, the paper feed motor restarts, and the reverse motor starts to rotate in the forward direction.
14) The reverse sensor is turned ON, and detects the leading edge of the sheet.
15) When the trailing edge of the sheet leaves the timing sensor, the paper feed motor starts to slow down to stop.

   (After the paper feed motor has completely stopped, if there is a next sheet to be inserted, the paper feed motor starts to reverse to take it in.)
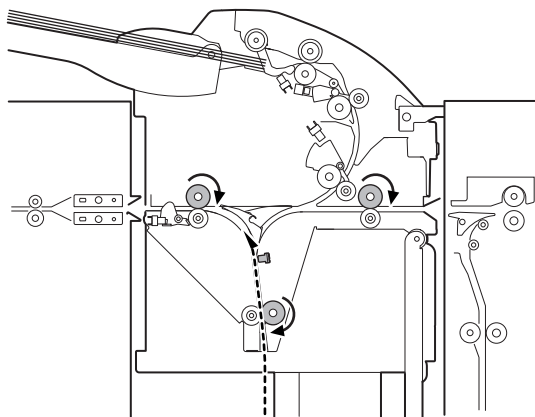
16) The reverse sensor is turned OFF. The trailing edge of the sheet is detected, and the flapper solenoid in the reverse section is turned OFF. When the sheet travels a predetermined distance, the reverse motor stops.

[Exiting from reverse section]
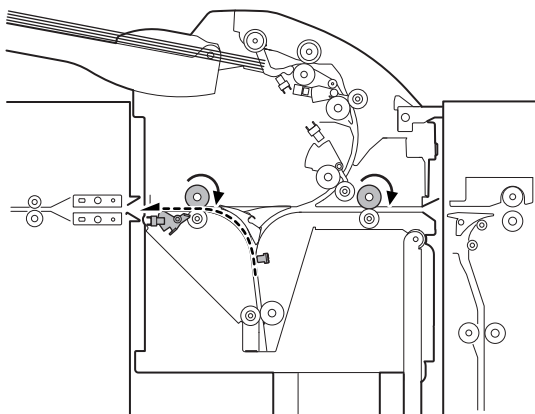
17) When the reverse motor has completely stopped, the reverse motor starts to reverse, and the transport motor starts.

18) The reverse sensor is turned ON, and detects the leading edge of the sheet.
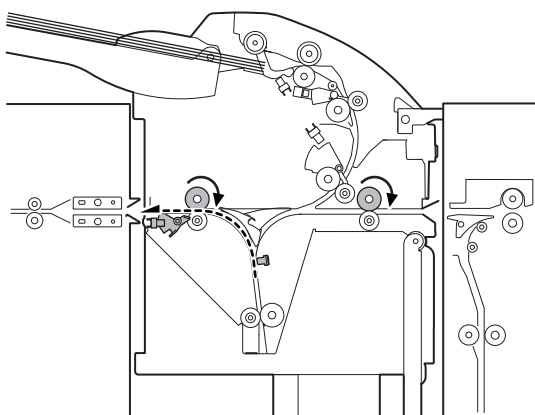
19) The paper exit sensor is turned ON, and detects the leading edge of the sheet.

20) The reverse sensor is turned OFF. When the sheet travels a predetermined distance after its trailing edge is detected, the reverse motor stops.

(If the next sheet waits at the leading-edge registration position, the flapper solenoid in the reverse section is turned ON, the paper feed motor starts to rotate in the forward direction, and the reverse motor starts to rotate in the forward direction.)

[Paper exit]
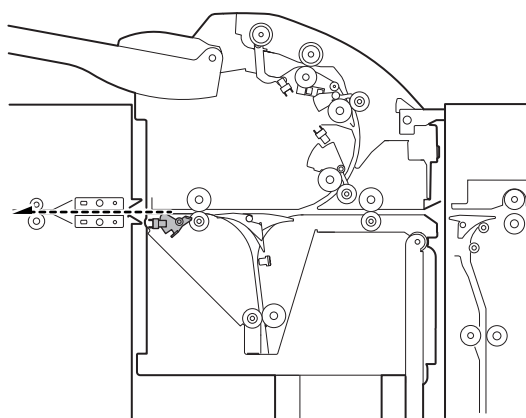
21) The paper exit sensor is turned OFF, and the trailing edge of the sheet is detected.

22) If there is no next sheet to be inserted, the transport motor stops.

4. Offline mode setting

A. How to set punching mode

The figure below shows the operator panel.
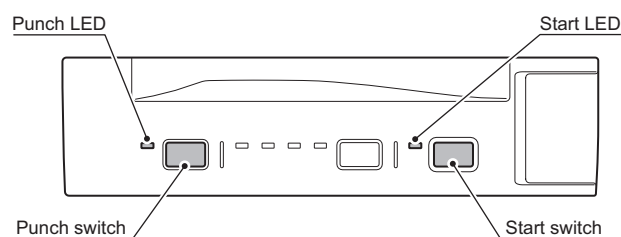
Setting procedure:
1) Place a sheet in the tray.
2) Press the PUNCH switch on the operator panel.
3) The PUNCH LED lights up to indicate that setting has been completed.
4) Press the START switch to start operation.

Canceling procedure:
5) Press the PUNCH switch on the operator panel.
6) The PUNCH LED goes out to indicate that setting has been canceled.

NOTE: If you cannot make or cancel setting by following the respective procedures above, refer to "5. LED indication on operation panel" shown later. When no LEDs are lit, check the setting made by the main unit and the inserter status.

B. How to set stapling mode
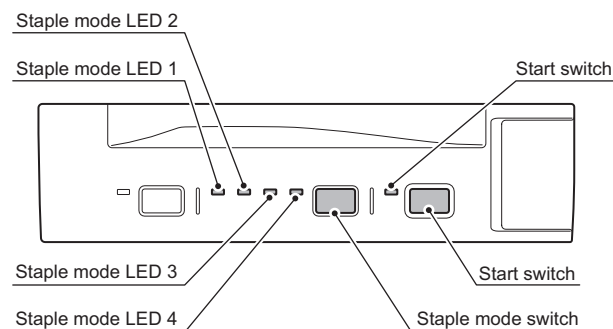
Setting procedure:

1) Place a sheet in the tray.
2) Press the STAPLE MODE switch on the operator panel.
3) Each time you press the switch, the STAPLE MODE LEDs light up by turns in the following order: 1, 2, 3, 4 All LEDs OFF 1 ... (When the saddle mode is cannot be used, the order is: 1 2, 3, All LEDs OFF 1 ...)
4) When the desired LED lights up, press the START switch to start operation.

(Refer to the correspondence between the stapling modes and LEDs shown later.)

The correspondence between the punching/stapling mode settings and LEDs is shown below.

Canceling procedure:

5) Press the STAPLE MODE switch on the operator panel.
6) All the STAPLE MODE LEDs go out to indicate that setting has been canceled.

NOTE: If you cannot make or cancel setting by following the respective procedures above, refer to "5. LED indication on operation panel" shown later. When no LEDs are lit, check the setting made by the main unit and the inserter status.

NOTE: The punching mode and saddle mode cannot be used at the same time.

Punch LED	Staple mode LEDs				Stapling mode
	LED1	LED2	LED3	LED4	
❍	●	❍	❍	❍	1-point stapling at back
❍	❍	●	❍	❍	2-point stapling
❍	❍	❍	●	❍	1-point stapling at front
❍	❍	❍	❍	●	Saddle stapling (saddle stitching)
●	❍	❍	❍	❍	Punching
●	●	❍	❍	❍	Punching + 1-point stapling at back
●	❍	●	❍	❍	Punching + 2-point stapling
●	❍	❍	●	❍	Punching + 1-point stapling at front

* ●: means "Lit."

5. LED indication on operator panel

Status	Cause	Explanation	START LED Red	START LED Green	MODE LED
Empty tray					The selected MODE LED is lit.
	Inserter problem				
	Finisher problem				
	Paper jam in inserter		Lit		The LED of the selected mode is lit.
	Paper jam in finisher		Lit		The LED of the selected mode is lit.
	Inserter alarm				The LED of the selected mode is lit.
	Finisher alarm				The LED of the selected mode is lit.
	Open inserter cover				The LED of the selected mode is lit.
	Open finisher cover				The LED of the selected mode is lit.
	Offline operation disabled				
	Inserter tray specified stapling mode non-usable Punching non-usable				The LED of the selected mode is lit.
	Operation mode Stapling disabled Punching disabled				The LED of the selected mode is blinking.
	Full tray (considered as a kind of finisher alarms)				The LED of the selected mode is lit.
	Other				
Paper-loaded tray (Operable)				Lit	The LED of the selected mode is lit.
Paper-loaded tray(Non-operable)	Inserter problem		Lit		
	Finisher problem		Lit		The LED of the selected mode is lit.
	Paper jam in inserter		Lit		
	Paper jam in finisher		Lit		The LED of the selected mode is lit.
	Inserter alarm		Blinking		The LED of the selected mode is lit.
	Finisher alarm		Blinking		The LED of the selected mode is blinking.
Paper-loaded tray (Non-operable)	Open inserter cover				The LED of the selected mode is lit.
	Open finisher cover				The LED of the selected mode is lit.
	Incompatible paper size	A non-usable paper size "A4 lateral," etc. is added when the saddle mode is selected: Extra size	Blinking		The LED of the selected mode is lit.
	Offline operation disabled				
	Inserter tray specified stapling mode non-usable Punching non-usable	The selected mode is non-usable.			The LED of the selected mode is blinking.
	Operation mode Stapling disabled Punching disabled	The selected mode is disabled.			The LED of the selected mode is blinking.
	Full tray (considered as a kind of finisher alarms)	The tray corresponding to the selected mode is full.	Blinking		The LED of the selected mode is blinking.
	Over loaded		Blinking		The LED of the selected mode is blinking.
	Paper loaded in the finisher intermediate process tray		Blinking		The LED of the selected mode is lit.
	Other	Main unit status "operation disabled," finisher status "non-operable," etc.			The LED of the selected mode is lit.
Waiting for start of offline operation		After a user presses the START switch		Blinking	The LED of the selected mode is lit.
In offline operation				Blinking	The LED of the selected mode is lit.

NOTE: For LED status, each blank means "not lit."

6. Paper jam/error detection

A. List of Paper jams

Description	Detection timing	Explanation
Not arrived at registration sensor	At a time of separating a sheet	A paper jam is detected if the registration sensor is not turned ON, which means absence of a sheet, even when the paper feed motor has been driven for a fixed distance after the pickup roller starts to lower.
Not arrived at timing sensor	At a time of leading-edge registration	A paper jam is detected if the timing sensor is not turned ON, which means absence of a sheet, even when the registration rollers (paper feed motor) have been driven for a fixed distance after they are started.
Not arrived at paper exit sensor	At a time of paper exit in through mode	A paper jam is detected if the paper exit sensor is not turned ON by the leading edge of a sheet, which means absence of a sheet, even when the transport motor has been driven for a fixed distance after the main unit sends a paper exit command.
	At a time of paper exit in normal paper feed mode	A paper jam is detected if the paper exit sensor is not turned ON, which means absence of a sheet, even when the leading edge of a sheet has traveled a fixed distance after it reaches the paper exit rollers (horizontal transport rollers 2).
	At a time of paper exit in reverse paper feed mode	A paper jam is detected if the paper exit sensor is not turned ON, which means absence of a sheet, even when a sheet has been transported a fixed distance by the transport motor after the reverse sensor is turned ON, which means presence of a sheet.
Not arrived at reverse sensor	At a time of entering reverse section	A paper jam is detected if the reverse sensor is not turned ON, which means absence of a sheet, even when the reverse motor has been driven for a fixed distance after leading-edge registration.
	At a time of exiting from reverse section	A paper jam is detected if the reverse sensor is turned ON, which means absence of a sheet, even when the reverse motor has been driven for a fixed distance while a sheet is exiting from the reverse section.
Stay at registration sensor	At a time of paper exit in normal paper feed mode	A paper jam is detected if the registration sensor is not turned OFF, which means presence of a sheet, even when the paper feed motor has been driven for a predetermined amount after a sheet reaches the starting position of leading-edge registration.
	At a time of entering reverse section in reverse paper feed mode	
Stay at timing sensor	At a time of paper exit in normal paper feed mode	A paper jam is detected if the timing sensor is not turned OFF, which means presence of a sheet, even when the paper feed motor has been driven for a fixed distance after the registration sensor is turned OFF, which means absence of a sheet.
	At a time of entering reverse section in reverse paper feed mode	
Stay at paper exit sensor	At a time of paper exit in through mode	A paper jam is detected if the paper exit sensor is not turned OFF, which means presence of a sheet, even when the transport motor has been driven for a predetermined amount after the paper exit sensor is turned ON, which means presence of a sheet.
	At a time of paper exit in normal paper feed mode	A paper jam is detected if the paper exit sensor is not turned OFF, which means presence of a sheet, even when the transport motor has been driven for a fixed distance after the trailing edge of a sheet reaches the paper exit rollers (horizontal transport rollers 2).
	At a time of paper exit in reverse paper feed mode	
Stay at reverse sensor	At a time of entering reverse section	A paper jam is detected if the reverse sensor is not turned OFF, which means presence of a sheet, even when the reverse motor has been driven for a fixed distance after the timing sensor is turned OFF, which means absence of a sheet.
	At a time of exiting from reverse section	A paper jam is detected if the reverse sensor is not turned OFF, which means presence of a sheet, even when the reverse motor has been driven for a predetermined amount after the reverse sensor is turned ON, which means presence of a sheet.

B. Error detection

(1) EEPROM errors

Explanation:

1) Timeout error

The EEPROM is being programmed even after a predetermined time period (150 msec) has passed.

2) Writing error

The written data does not match the read data even when writing and reading are retried.

3) Reading error

Checking pieces of data read from three sources results in mismatch even when checking is retried.

(2) Reverse sensor adjustment error

Explanation:

1) When the DA output exceeds the upper limit

Even when the DA output is increased, the AD input value does not fall within the appropriated range.

2) When the DA output is less than the lower limit

Even when the DA output is decreased, the AD input value does not fall within the appropriated range.

C. Alarm detection

Explanation:

An alarm is issued because the size of a sheet in the tray cannot be correctly detected when both the sub tray pullout detection sensor and the sub tray retraction detection sensor are turned OFF.

Indication:

Shown by a LED on the operator panel of the inserter or of the main unit as an inserter alarm.

[6] DISASSEMBLY AND ASSEMBLY

1. Paper feed separation unit

A. Pickup roller & paper feed roller

1) Open the top cover.
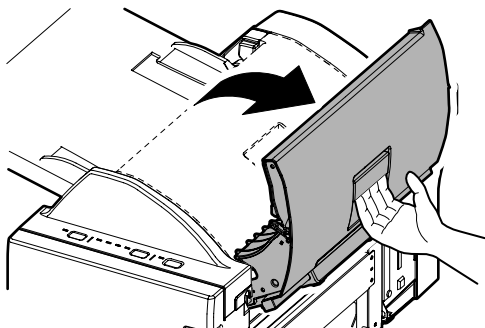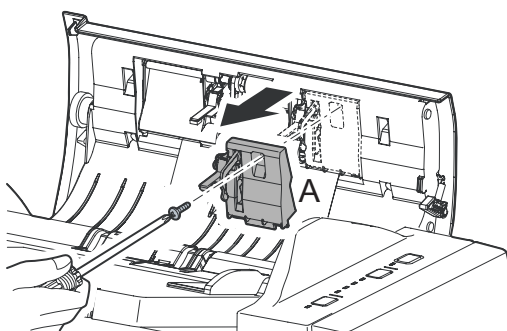
2) Remove the cover A.

3) Turning the unit A, remove the roller guide B.
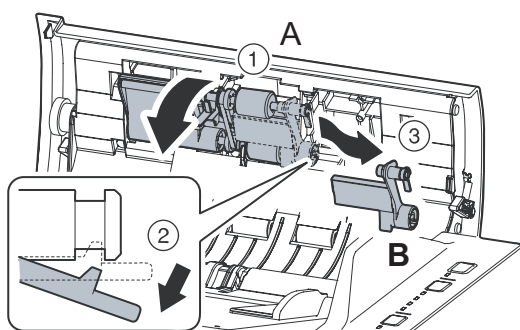
4) Remove the pickup roller and paper feed roller.
   A: Pickup roller
   B: Paper feed roller
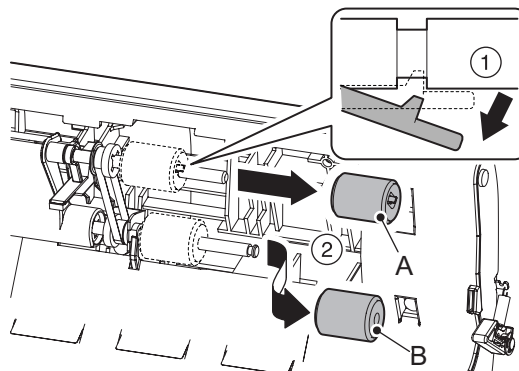
B. Torque limiter & separation roller

1) Open the top cover.
2) Remove the cover A.
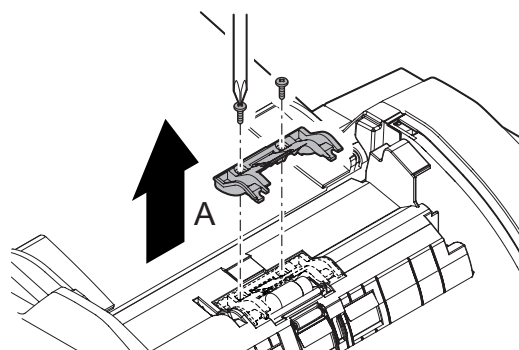
3) Turn the unit A to remove.
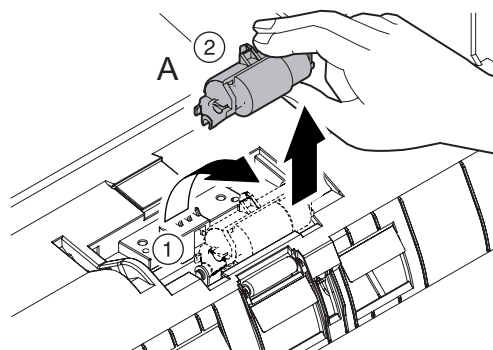
4) Remove the torque limiter and the separation roller.
   A: Horizontal pass roller 2
   B: Timing roller
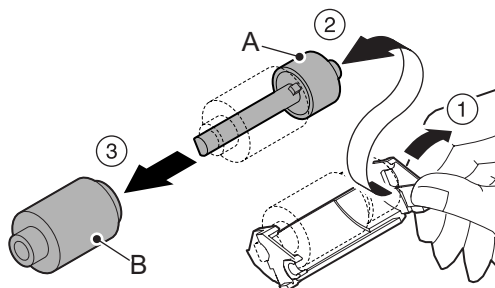
2. Paper feed unit

A. Horizontal pass roller 1 and registration roller

Paragraph in Sub Section.
1) Open the top cover.
2) Open the mount cover.
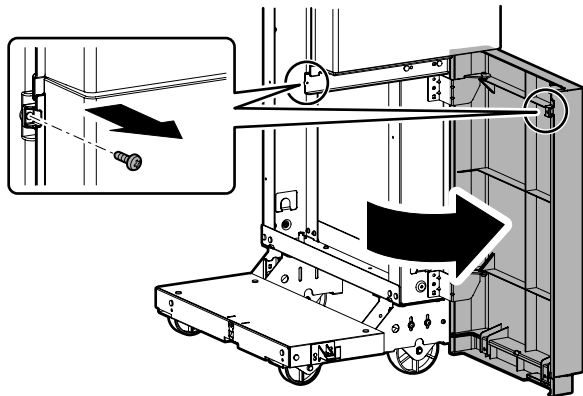
3) Remove the front cover.
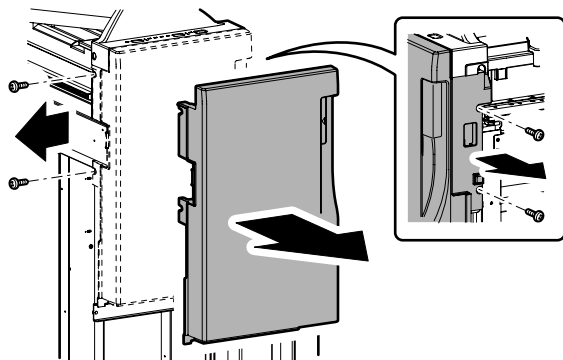
4) Remove the rear cover.
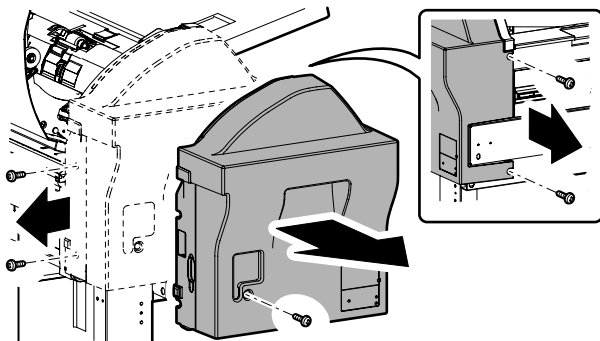
5) Remove the top cover.
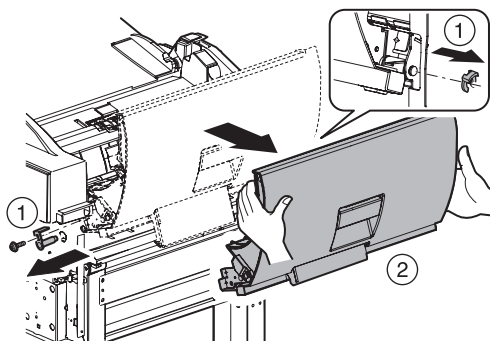
A: Horizontal pass roller 1
B: Registration roller
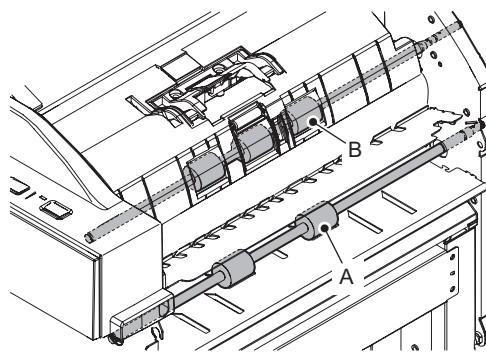
B. Horizontal pass roller 2 and timing roller

1) Open the top cover.
2) Remove the front cover and rear cover.
3) Remove the operating unit.
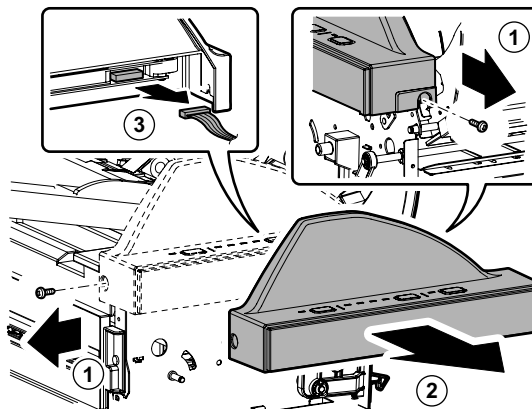
4) Remove the cover A.
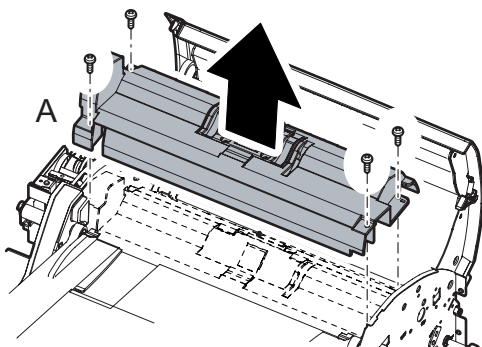
5) Remove the tray unit.
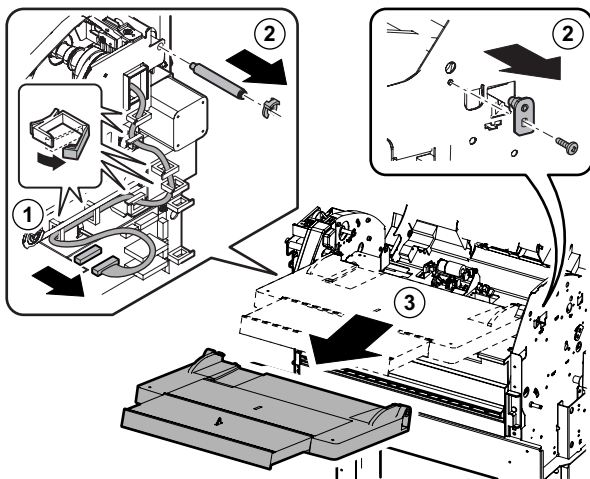
6) Remove the cover A.
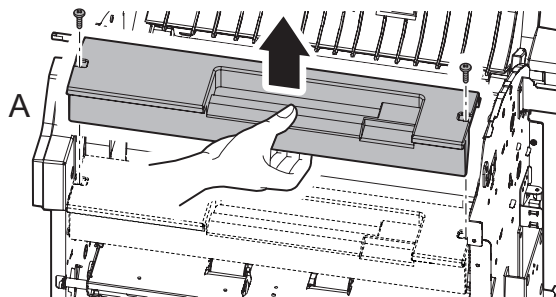
A: Horizontal pass roller 2
B: Timing roller
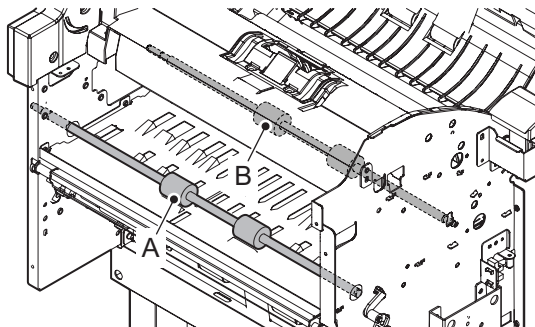
C. Reverse roller and reverse sensor

1) Open the top cover.
2) Remove the front cover and rear cover.
3) Remove the guide A to remove the stay B.
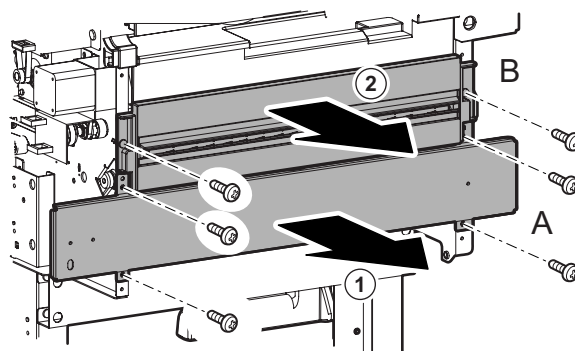
4) Remove the reverse unit.
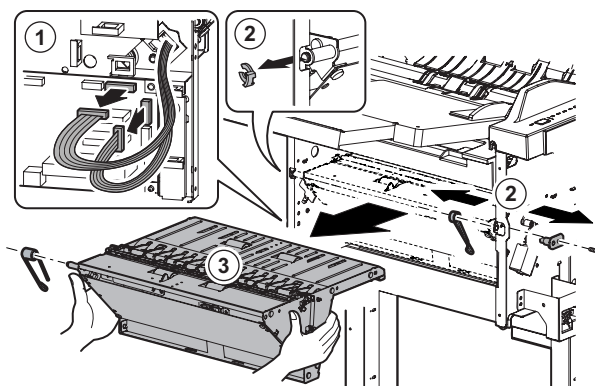
5) Remove the cover A.
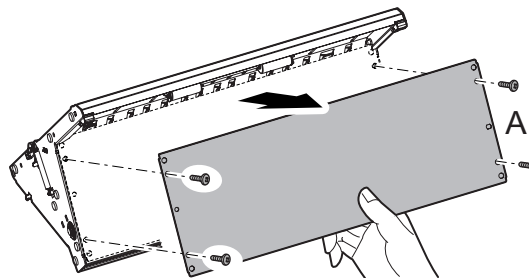
A: Reverse sensor
B: Reverse roller
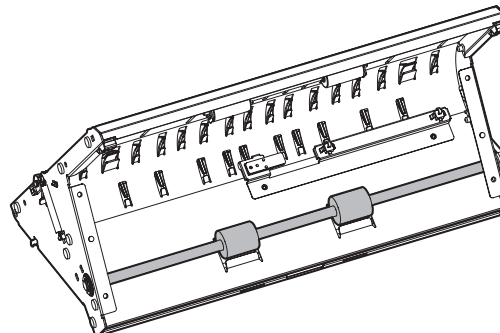
D. Paper guide
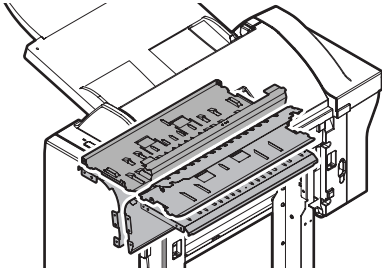
3. Drive unit

A. Belts

1) Open the top cover.
2) Remove the rear cover.
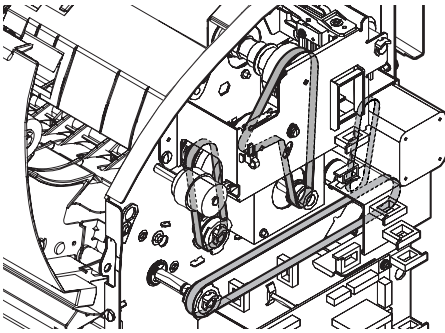
B. Gears

1) Open the top cover.
2) Remove the rear cover.
3) Remove the drive unit.
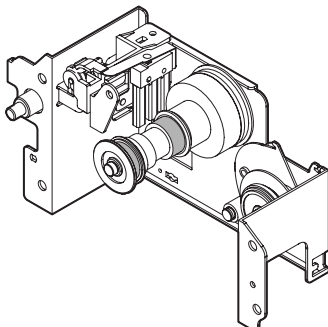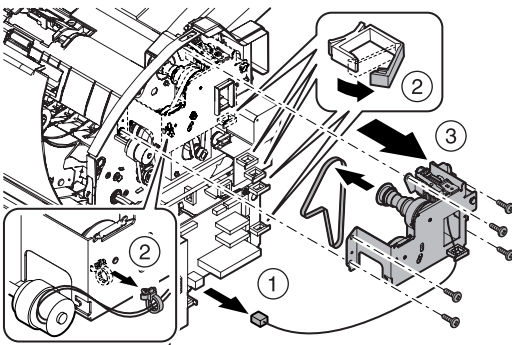
4. PWB

A. Operation panel PWB

1) Remove the front cover.
2) Remove the operating unit.
3) Remove the operation panel PWB.
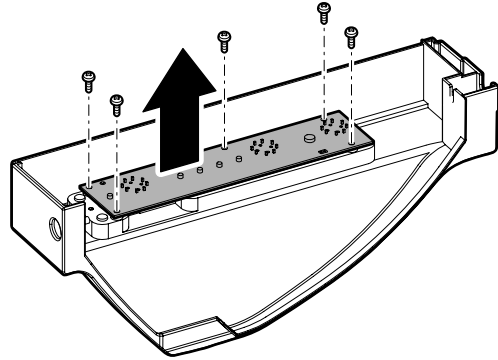
B. Main control PWB

1) Remove the rear cover.
2) Remove the main control PWB.
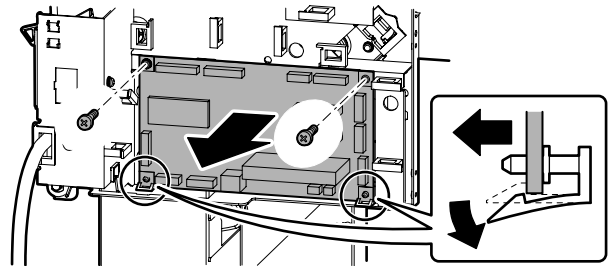
5. Motor

A. Paper feed motor

1) Remove the rear cover.
2) Remove the drive unit.
3) Remove the paper feed motor.
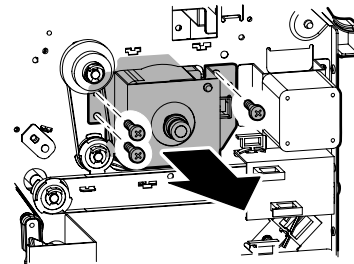
B. Transport motor

1) Remove the rear cover.
2) Remove the transport motor.
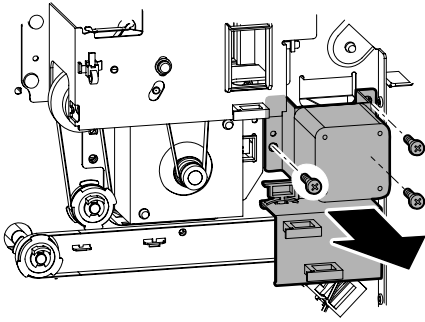
C. Reverse motor

1) Remove the front cover and rear cover.
2) Remove the reverse unit.
3) Remove the cover A.
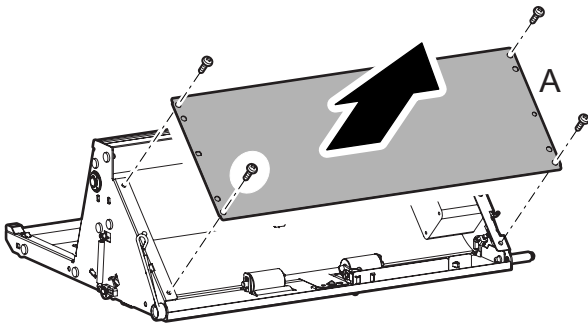
4) Remove the reverse motor.
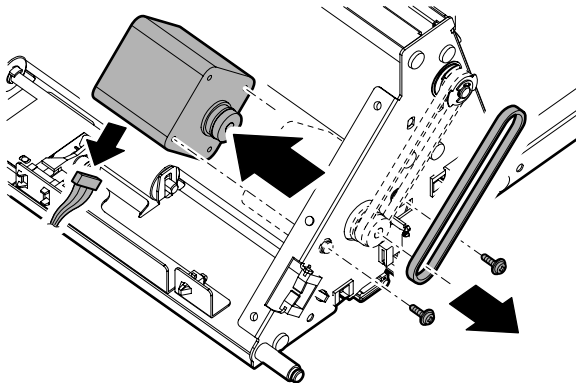
6. Other parts

A. Sensors
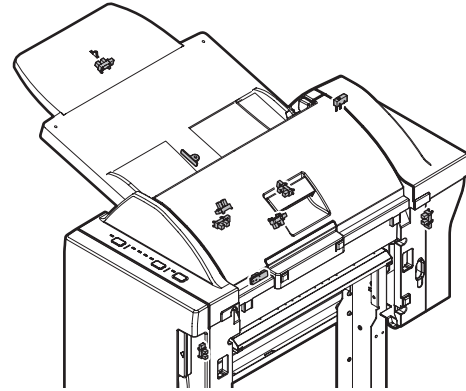
B. Tray sensor

1) Open the top cover.
2) Remove the front cover and rear cover.
3) Remove the operating unit.
4) Remove the tray unit.
5) Disassemble the tray.
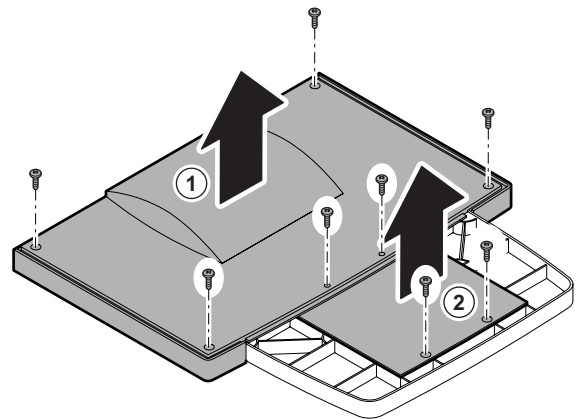
6) Remove the tray sensor.
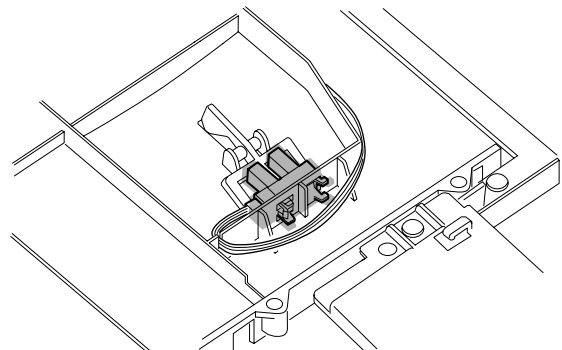
C. Registration sensor and empty sensor

1) Open the top cover.
2) Remove the front cover and rear cover.
3) Detach the top cover.
4) Remove the registration sensor and the empty sensor.

A: Empty sensor

B: Registration sensor

D. Set sensor

1) Open the rear cover.
2) Remove the set sensor
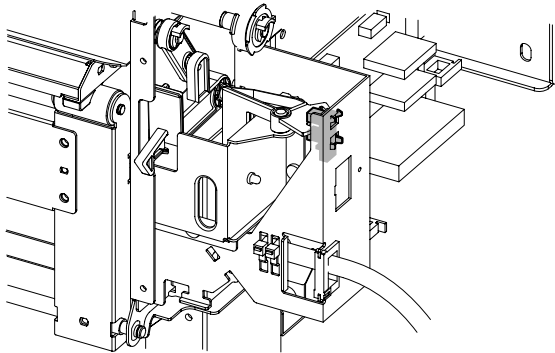
E. Reverse unit open/close sensor

1) Remove the front cover.
2) Remove the reverse unit open/close sensor.

F. Paper exit sensor

1) Remove the front cover and rear cover.
2) Remove the reverse unit.
3) Remove the cover. (See the step 3 of 5-C.)
4) Remove the paper exit sensor.

G. Flapper solenoid

1) Remove the rear cover.
2) Remove the flapper solenoid.
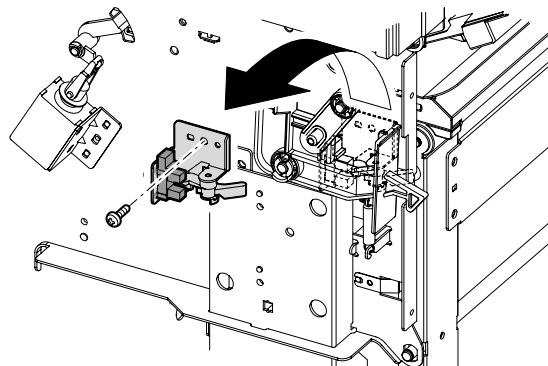
7. Note on assembly

A. Reverse flapper solenoid adjustment

1) Rotate the solenoid lever (LVR-FM-SOL) fully clockwise.

2) Adjust the position of the bracket (BKT-FM-SOL) of the solenoid so that the solenoid's arm is completely retracted (that there is no clearance in the rubber spacer, the stopper E-ring, and the main unit of the solenoid). When adjusted, fix the bracket with screws.

LVR-FM-SOL

Stopper E-ring

Rubber spacer

Solenoid main unit

Screw

BKT-FM-SOL
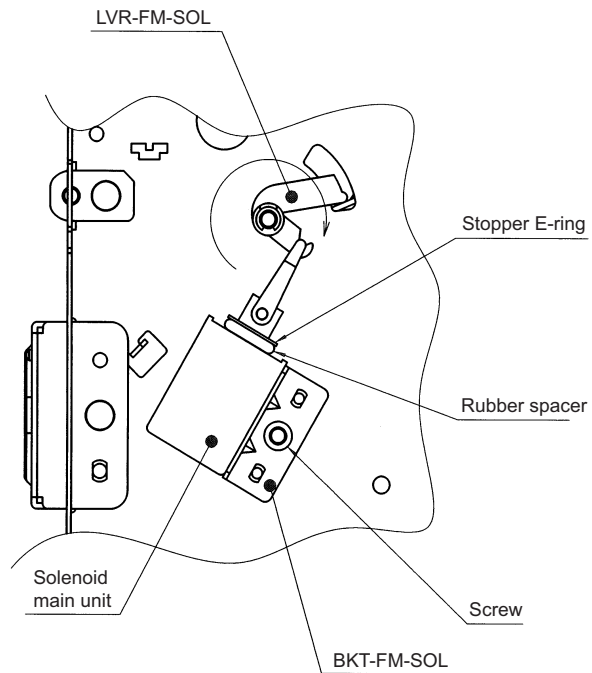
[7] MAINTENANCE

1. Maintenance list

X: Checking (clean, replace or adjust as required) ❍: Cleaning ▲: Replace Δ: Adjust ☆: Lubricate ❏: Position shift

No.	Parts name	When calling	300K	600K	900K	1200K	1500K	1800K	2100K	2400K	2700K	3000K	Remarks
1	Pickup rollers/ paper feed rollers	X	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	(Note 1)
2	Torque limiter	X	X	X	X	X	X	X	X	X	X	X	(Note 2)
3	Transport rollers	X	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	
4	Transport paper guides	X	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	
5	Gears	X	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Lubricate necessary parts (Specified positions)
6	Belts		X	X	X	X	X	X	X	X	X	X	
7	Sensors	X	X	X	X	X	X	X	X	X	X	X	
8	Discharge brush	X	X	X	X	X	X	X	X	X	X	X	

Note 1 : Replacement reference: For replacement, refer to each paper feed port counter value: 150 K or 1 year after the start of use

Note 2 : Replacement reference: For replacement, refer to each paper feed port counter value: 400 K
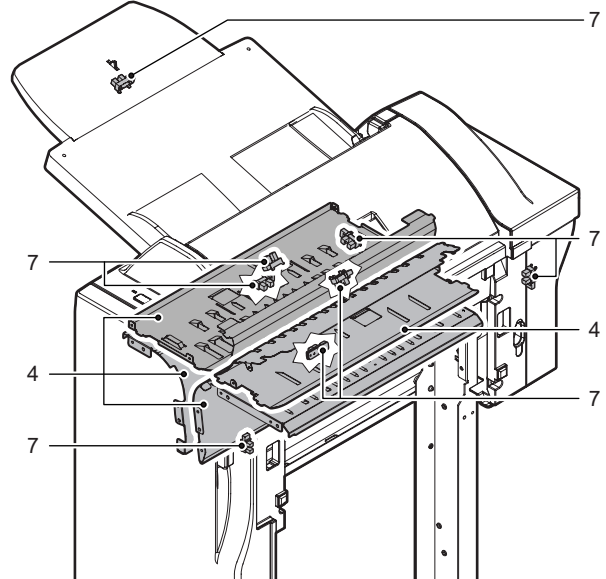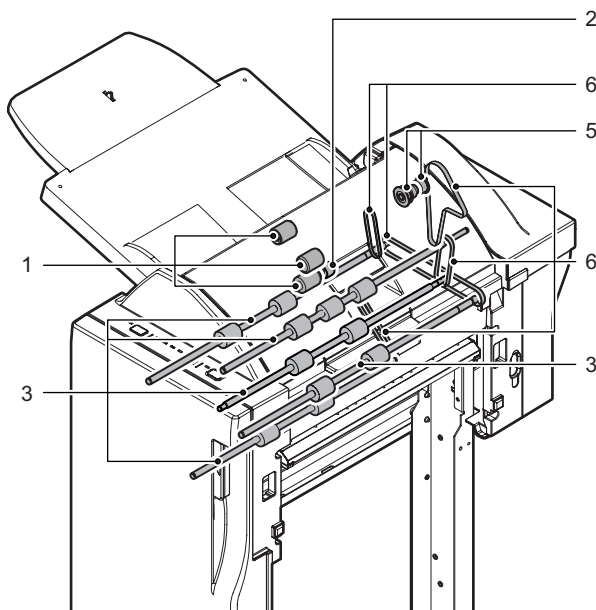
[8] ADJUSTMENTS

1. Paper width detection level setting (adjustment)

LED 6   LED 5   LED 4   LED 3   LED 2   LED 1

PUNCH key   Operator panel   STAPLE key   START key
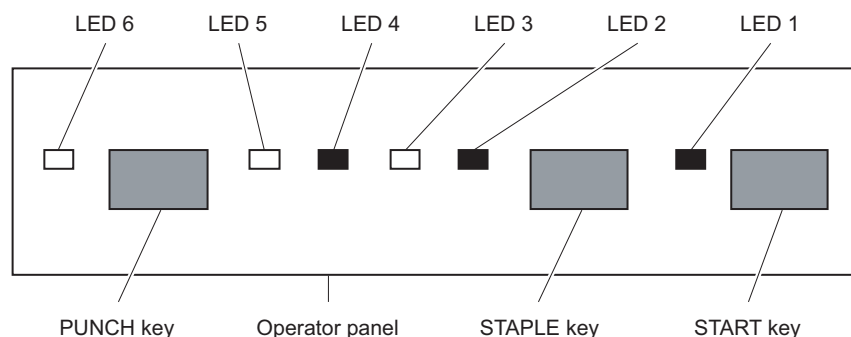
1) Enter the diag mode.

Press and hold PUNCH key and START key, and turn on the power of the main unit.

The LCD display of the main unit turns on and off, then turns on again.

Check that LED1 is flashing, and release PUNCH key and START key.

2) Press START key.

The display changes to the diag mode.

3) Press PUNCH key and STAPLE key to set to the paper width detection level setting (adjustment) mode.

The diag mode is displayed by combination of LED lighting.

■ : Lighting   □ : OFF

Diag mode No.	Diag mode	LED lighting
11	Paper width detection level setting (adjustment) mode	6 5 4 3 2 1 □ □ ■ □ ■ ■

4) Press START key. (The selected diag mode is executed.)

5) Check that LED2 is flashing, and set the paper guide to the max. width position.

6) Press START key.

7) Check that LED3 is flashing, and set the paper guide to A4R width position.

8) Press START key.

9) Check that LED4 is flashing, and set the paper guide to A5R width position.

10) Press START key.

11) Check that LED5 is flashing, and set the paper guide to the min. width position.

12) Press START key.

When setting (adjustment) is completed normally, LED1 lights up. When it is failed, LED1 flashes more rapidly.

[9] SIMULATION

1. List

Code		Function (purpose)	Purpose	Section
Main	Sub			
3	30	Used to check the operations of the sensors and detectors in the inserter and the control circuits.	Operation test/Check	Inserter
	31	Used to check the operations of the loads in the inserter and the control circuit.	Operation test/Check	Inserter
	32	Used to set the adjustment value of the inserter paper width detection level.	Setting (Adjustment)	Inserter

2. Details of trouble code

3

3-30

Purpose	Operation test/Check
Function (Purpose)	Used to check the operations of the sensors and detectors in the inserter and the control circuits.
Section	Inserter

Operation/Procedure

The operating conditions of the sensors and detectors are displayed.

Sensors and detectors which are turned on are highlighted.

TH_SEN	Inserter sub tray pull-out detection
TS_SEN	Inserter sub tray storage detection
T_SEN	Inserter tray paper length detection
EMP_SEN	Inserter tray empty detection
REG_SEN	Inserter resist detection
TIM_SEN	Inserter timing detection
JCK_SEN	Inserter JAM cover open/close detection
H_SEN	Inserter reverse detection
HI_SEN	Inserter paper exit detection
HYK_SEN	Inserter reverse unit open/close detection
P_ST_SW	Inserter start SW
P_MO_SW	Inserter staple mode select SW
P_PN_SW	Inserter punch select SW
SET_SW	Inserter set SW

3-31

Purpose	Operation test/Check
Function (Purpose)	Used to check the operations of the loads in the inserter and the control circuit.
Section	Inserter

Operation/Procedure

1) Select a target of the operation check with the touch panel.

2) Press [EXECUTE] key.

The selected load is operated.

When [EXECUTE] is pressed, the operation is stopped.

K_MOT	Inserter paper feed motor
Y_MOT	Inserter horizontal transport motor
H_MOT	Inserter reverse motor
F_SOL	Inserter flapper solenoid
R_CL	Inserter resist clutch
P_LED	Inserter operation panel upper LED

Purpose	Setting (Adjustment)
Function (Purpose)	Used to set the adjustment value of the inserter paper width detection level.
Section	Inserter

Operation/Procedure

1) Select an item corresponding to the adjustment content with [↑] and [↓] keys on the touch panel.

2) Enter the adjustment value with 10-key.

3) Press [OK] key. (The set value is saved.)

Item	Display	Item	Set range
A	MAX. POSITION	Inserter tray width detection adjustment value (Max. width)	0 - 1023
B	POSITION 1	Inserter tray width detection adjustment value (Adjustment position 1)	0 - 1023
C	POSITION 2	Inserter tray width detection adjustment value (Adjustment position 2)	0 - 1023
D	MIN. POSITION	Inserter tray width detection adjustment value (Min. width)	0 - 1023

```
┌─────────────────────────────────────────────────────────┐
│ ▆▆  SIMULATION NO.03-32                      [ CLOSE ]   │
│ TEST                                                      │
│ INSERTER TRAY VALUE SETTING                               │
│            ┌──────┐    A : 72   ;   MAX. POSITION         │
│   A:       │  72  │    B : 200  ;   POSITION1             │
│            └──────┘    C : 10   ;   POSITION2             │
│           [ 0～1023 ]  D : 100  ;   MIN. POSITION         │
│                                                           │
│                                              [ ⬆ ]        │
│                                              [ ⬇ ]        │
│                                                           │
│                                              [ OK ]       │
└─────────────────────────────────────────────────────────┘
```

[10] SELF DIAG MESSAGE AND TROUBLE CODE

Problem		The inserter does not perform at all when the main switch of the main unit is turned ON.
Case1	Cause	Loose contact with the main unit
	Check and remedy	Check that each connector is firmly connected.
Case2	Cause	Loose contact of the connector terminal of the wire (interface harness) connecting with the main unit
	Check and remedy	Check continuity in between the connector terminals. Replace the connection wire if no continuity is measured
Case3	Cause	JAM cover open/close switch fault
	Check and remedy	Check continuity between the switch contacts. Replace the contacts if no continuity is measured.
Case4	Cause	Controller PCB fault
	Check and remedy	Check that 24 V DC and 5 V DC are supplied from the main unit after the above cases 1 to 3 are confirmed. If 24 V and 5 V are not present at CN1-2 pin and IC5-32 pin on the PCB, replace the controller PCB.

Problem		The paper feed motor does not operate. The reverse motor does not operate. The horizontal transport motor does not operate.
Case1	Cause	Loose contact of the motor connector terminal
	Check and remedy	Check continuity of the connector contacts.(CN1 to 3)
Case2	Cause	Disconnection of the motor coil
	Check and remedy	Check continuity between the connector terminals. Replace the connection wire if no continuity is measured.
Case3	Cause	Controller PCB fault
	Check and remedy	If the motor does not operate in the motor single operation mode, replace the controller PCB.

Problem		The paper is delivered without being reversed in the reverse paper feed mode.
Case1	Cause	Connector terminal fault of the reverse solenoid
	Check and remedy	Check continuity of the connector contact.(CN4)
Case2	Cause	Disconnection of the solenoid coil
	Check and remedy	Inspect the coil for continuity. Replace the coil if no continuity is measured.
Case3	Cause	Controller PCB fault
	Check and remedy	If the solenoid does not perform in the solenoid single operation mode, replace the controller PCB.

Problem		Paper jam is displayed on the system display.
Case1	Cause	Paper jam
	Check and remedy	Visual observation. Take out paper jams.
Case2	Cause	Reverse sensor fault
	Check and remedy	Measure a voltage of TP2 on the controller PCB and check that 3 to 3.6 V is observed when no paper is stacked, and that 1.5 V or less is observed when paper is stacked. Replace the sensor if the measured voltage exceeds these ranges.
Case3	Cause	Paper exit sensor fault
	Check and remedy	Measure a voltage of TP7 on the controller PCB and check that 5 V is observed when no paper is stacked, and that 1 V or less is observed when paper is stacked. Replace the sensor if the measured voltage exceeds these ranges.
Case4	Cause	Empty sensor fault
	Check and remedy	Measure a voltage of TP4 on the controller PCB and check that 1 V or less is observed when no paper is stacked, and that 5 V is observed when paper is stacked. Replace the sensor if the measured voltage exceeds these ranges.
Case5	Cause	Registration sensor fault
	Check and remedy	Measure a voltage of TP5 on the controller PCB and check that 5 V is observed when no paper is stacked, and that 1 V or less is observed when paper is stacked. Replace the sensor if the measured voltage exceeds these ranges.
Case6	Cause	Timing sensor fault
	Check and remedy	Measure a voltage of TP6 on the controller PCB and check that a 5 V is observed when no paper is stacked, and that 1 V or less is observed when paper is stacked. Replace the sensor if the measured voltage exceeds these ranges.
Case7	Cause	Controller PCB fault
	Check and remedy	If the problem is not solved with the sensors whose level changes when each is turned ON/OFF, replace the controller PCB.

Problem		The machine does not detect the paper.
Case1	Cause	Tray sensor fault
	Check and remedy	Measure a voltage of TP13 on the controller PCB and check that 5 V is observed when no paper is stacked, and that 1 V or less is observed when paper is stacked. Replace the sensor if the measured voltage exceeds these ranges.
Case2	Cause	Controller PCB fault
	Check and remedy	If the problem is not solved with a change in the sensor level after the above case 1 is confirmed, replace the controller PCB.

Problem		The machine does not detect the paper.	
	Case1	Cause	JAM cover open/close switch fault
		Check and remedy	Check continuity between the switch contacts. Replace the switch if no conduction is measured.
	Case2	Cause	Reverse unit open/close sensor fault
		Check and remedy	Measure a voltage of TP9 on the controller PCB and check that 1 V or less is observed when the reverse unit is open, and that 5 V is observed when the reverse unit is closed. Replace the sensor if the measured voltage exceeds these ranges.
	Case3	Cause	Controller PCB fault
		Check and remedy	If the problem is not solved by a change in the sensor level after the above cases 1 to 3 are confirmed, replace the controller PCB.

Problem		Inserter unset is displayed on the system display.	
	Case1	Cause	Set sensor fault
		Check and remedy	Measure a voltage of TP16 on the controller PCB and check that 5 V is observed when the inserter is set, and that 1 V or less is observed when the inserter is not set. Replace the sensor if the measured voltage exceeds these ranges.
	Case2	Cause	Controller PCB fault
		Check and remedy	If the problem is not solved by a change in the sensor level after the above case 1 is confirmed, replace the controller PCB.

Problem		The registration clutch does not perform.	
	Case1	Cause	Loose contact of the clutch connector terminal
		Check and remedy	Check continuity of the connector contacts. (CN4)
	Case2	Cause	Disconnection of the clutch coils
		Check and remedy	Inspect the coils for continuity. Replace the coils if no continuity is measured.
	Case3	Cause	Controller PCB fault
		Check and remedy	If the clutch does not perform in the clutch single operation mode, replace the controller PCB.

M E M O

[11] ELECTRICAL SECTION

1. Actual wiring chart

PF3090 PBA-CONT

Reverse sensor — SPI-337-01
+5V	CN16-3	① BE
H_SEN	CN16-2	② BE
H_SEN_DA	CN16-1	③ BE
173977-3

Paper exit sensor — TLP1241(C5,F)
+5V	CN17-3	④ BE
SGND	CN17-2	⑤ BE
HI_SEN	CN17-1	⑥ BE
173977-3

PF3090K210 ASM-SNS-H

BE ①	CN11-1	+5V
BE ②	CN11-2	H_SEN
BE ③	CN11-3	H_SEN_DA
④	CN11-4	N.C.
⑤	CN11-5	N.C.
BE ④	CN11-6	+5V
BE ⑤	CN11-7	SGND
BE ⑥	CN11-8	HI_SEN
173977-8   292161-8

| K_MOT_A |
| +24V |
| K_MOT_#A |
| K_MOT_B |
| +24V |
| K_MOT_#B |
B6B-XH-A

Reverse unit open/close sensor — TLP1241(C5,F)
+5V	CN18-3	① BE
SGND	CN18-2	② BE
HYK_SEN	CN18-1	③ BE
173977-3

PF3092K211 ASM-SNS-C-92

BE ①	CN12-1	+5V
BE ②	CN12-2	SGND
BE ③	CN12-3	HYK_SEN
CN12-4	N.C.
CN12-5	N.C.
CN12-6	N.C.
173977-6   292161-6

| H_MOT_#B |
| H_MOT_B |
| H_MOT_#A |
| H_MOT_A |
| +24V |
| +24V |
B6B-EHIL

Set sensor — TLP1241(C5,F)
+5V	CN20-3	① BE
SGND	CN20-2	② BE
S_SEN	CN20-1	③ BE
173977-3

Empty sensor — TLP1241(C5,F)
+5V	CN21-3	④ BN
SGND	CN21-2	⑤ BN
KC_SEN	CN21-1	⑥ BN
173977-3

Resistration sensor — TLP1241(C5,F)
+5V	CN22-3	⑦ BK
SGND	CN22-2	⑧ BK
REG_SEN	CN22-1	⑨ BK
173977-3

Timing sensor — TLP1241(C5,F)
+5V	CN23-3	⑩ BE
SGND	CN23-2	⑪ BE
TIN_SEN	CN23-1	⑫ BE
173977-3

PF3090K212 ASM-SNS-K

BE ①	CN14-1	+5V
BE ②	CN14-2	SGND
BE ③	CN14-3	S_SEN
BN ④	CN14-4	+5V
BN ⑤	CN14-5	SGND
BN ⑥	CN14-6	EMP_SEN
BK ⑦	CN14-7	+5V
BK ⑧	CN14-8	SGND
BK ⑨	CN14-9	REG_SEN
BK ⑩	CN14-10	+5V
BE ⑪	CN14-11	SGND
BE ⑫	CN14-12	TIN_SEN
CN14-13	N.C.
1-173977-3   1-292161-3

| N.C. |
| +24V |
| +24V |
| Y_MOT_A |
| Y_MOT_#A |
| Y_MOT_B |
| Y_MOT_#B |
B7B-PH-K-S

| +24V |
| F_SOL |
| +24V |
| R_CL |
292161-4

Tray volume — Tray
+5V	CN24-1	+5V	① BE
T_VR	CN24-2	T_VR	② BE
SGND	CN24-3	SGND	③ BE
Housing SMP-03V-NC
Contact SHF-001T-0.8BS

Tray sensor
+5V	CN25-1	④ BE
T_SEN	CN25-2	⑤ BE
SGND	CN25-3	⑥ BE
Housing 179228-3
Contact 179227-1

PF3092K213 ASM-SNS-TR92

BE ①	CN13-1	+5V
BE ②	CN13-2	T_VR
BE ③	CN13-3	SGND
BE ④	CN13-4	+5V
BE ⑤	CN13-5	T_SEN
BE ⑥	CN13-6	SGND
CN13-7	+5V
BE ⑦	CN13-8	TH_SEN
CN13-9	SGND
CN13-10	+5V
CN13-11	TS_SEN
CN13-12	SGND
Housing 1-179228-2   1-292161-2
Contact 179227-1

| +24V |
| PGND |
B2P-VH(LF

| TxD0 |
| RxD0 |
| DTR0 |
| DSR0 |
| RESET |
| +5V |
| SGND |
292161-7

| TxD1 |
| RxD1 |
| DSR1 |
| DTR1 |
| RESET |
| SGND |
B6B-PH-K-S

Operator panel — PCB-PANEL
CN28-11	P_ST_SW	① BE
CN28-10	P_MD_SW	② BE
CN28-9	P_PN_SW	③ BE
CN28-8	P_PN_LED	④ BE
CN28-7	SGND	⑤ BE
CN28-6	P_MD_LED1	⑥ BE
CN28-5	P_MD_LED2	⑦ BE
CN28-4	P_MD_LED3	⑧ BE
CN28-3	P_MD_LED4	⑨ BE
CN28-2	P_ST_LED1	⑩ BE
CN28-1	P_ST_LED2	⑪ BE
1-173977-1

PF3090K214 ASM-PANEL

BE ①	CN15-1	P_ST_SW
BE ②	CN15-2	P_MD_SW
BE ③	CN15-3	P_PN_SW
BE ④	CN15-4	P_PN_LED
BE ⑤	CN15-5	SGND
BE ⑥	CN15-6	P_MD_LED1
BE ⑦	CN15-7	P_MD_LED2
BE ⑧	CN15-8	P_MD_LED3
BE ⑨	CN15-9	P_MD_LED4
BE ⑩	CN15-10	P_ST_LED1
BE ⑪	CN15-11	P_ST_LED2
1-173977-1   1-292161-1

| +24V |
| JCK_SW |
| #J_PTH |
53258-032

090 PBA-CONT

K_MOT_A	CN1-1		RD			RD	Paper feed motor
+24V	CN1-2		BK			BK	
K_MOT_*A	CN1-3		YW			YW	
K_MOT_B	CN1-4		BE			BE	
+24V	CN1-5		WE			WE	
K_MOT_*B	CN1-6		OE			OE	

B6B-XH-A(LF)
Housing XHP-6
Contact SXH-001T-P0.6

H_MOT_*B	CN2-1		OE			OE	Reverse motor
H_MOT_B	CN2-2		BE			WE	
H_MOT_*A	CN2-3		YW			BE	
H_MOT_A	CN2-4		RD			RD	
+24V	CN2-5		BK			BK	
+24V	CN2-6		WE			YW	

B6B-EH(LF)
Housing EHR-6
Contact SEH-001T-P0.6

N.C.	CN3-1		WE			OE	Horizontal transport motor
+24V	CN3-2		BK			WE	
+24V	CN3-3		RD			BE	
Y_MOT_A	CN3-4		YW			RD	
Y_MOT_*A	CN3-5		BE			BK	
Y_MOT_B	CN3-6		OE			YW	
Y_MOT_*B	CN3-7						

B7B-PH-K-S(LF)
Housing PHR-7
Contact SPH-002T-P0.5S

PF3090K219
ASM-SOL/CL

292156-2

| BE | | CN30-2 | +24V | CN30-1 | | BE |
| BE | | CN30-1 | F_SOL | CN30-2 | | BE |

173977-2   173977-2

Flapper solenoid

+24V	CN4-1		BE
F_SOL	CN4-2		BE
+24V	CN4-3		BE
R_CL	CN4-4		BE

292161-4   173977-4

292156-2

| BE | | CN31-2 | +24V | CN31-1 | | BE |
| BE | | CN31-1 | R_CL | CN31-2 | | BE |

173977-2   173977-2

Resistration clutch

| +24V | CN6-3 | | RD |
| PGND | CN6-4 | | GY |

B2P-VH(LF)
Housing VHR-2N
Contact SVH-21T-P1.1

Main Unit I/F

	BN	TxD	CN32-1
	SB	RxD	CN32-2
	PK	DTR	CN32-3
	VT	DSR	CN32-4
	YW	RESET	CN32-5
	RD	+24V	CN32-6
	BK	+5V	CN32-7
	WE	SGND	CN32-8
	GY	PGND	CN32-9
	BK	FGND	CN32-10
	OE	+24V	CN32-11
	BE	PGND	CN32-12

TxD0	CN7-1		BN
RxD0	CN7-2		SB
DTR0	CN7-3		PK
DSR0	CN7-4		VT
RESET	CN7-5		YW
+5V	CN7-6		BK
SGND	CN7-7		WE

292161-7
Housing 178228-7
Contact 178227-1

PF3092K217
ASM-I/F-92

Housing ELP-12V
Contact SLF-01T-P1.3E
Contact SLF-41T-P1.3E

| BK |
| BK |
| BE |

Finisher I/F

	BN	RxD	CN33-1
	RD	TxD	CN33-2
	BK	DTR	CN33-3
	YW	DSR	CN33-4
	PK	RESET	CN33-5
		N.C.	CN33-6
	BE	+5V	CN33-7
	VT	SGND	CN33-8
		N.C.	CN33-9
	BK	FGND	CN33-10
	OE	+24V	CN33-11
	BE	PGND	CN33-12

TxD1	CN9-1		RD
RxD1	CN9-2		BN
DSR1	CN9-3		YW
DTR1	CN9-4		BK
RESET	CN9-5		PK
SGND	CN9-6		VT

B6B-PH-K-S(LF)
Housing PHR-6
Contact SPH-002T-P0.5S

Housing ELR-12V
Contact SLM-01T-P1.3E
Contact SLM-41T-P1.3E

JAM cover open/close switch
DE2L-FAAA

PF3090K218
ASM-SW

+24V	CN10-1		RD
JCK_SW	CN10-2		YW
*J_PTH	CN10-3		BE

53258-0329
Housing 51067-0300
Contact 50217-8000

	YW	JCK_SW	CN10-1
	RD	+24V	CN10-2
	BE	*J_PTH	CN10-3

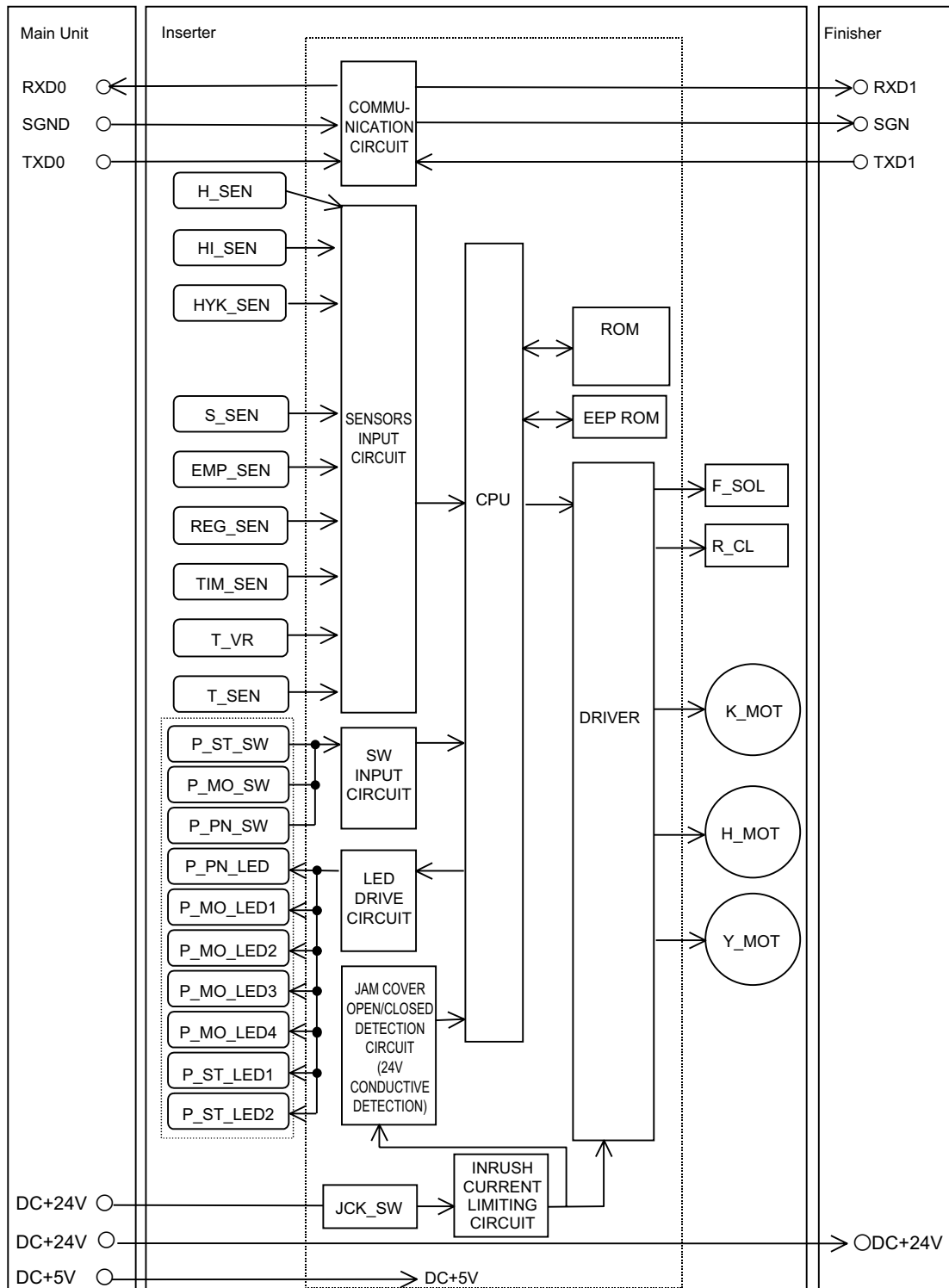Sleeve DS-110U
FASTON Terminal STO-01T-110N

2. Circuit description

A. Outline

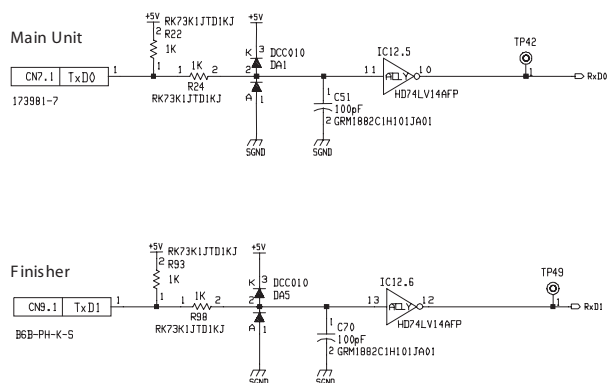This circuit controls paper feed, transport, reverse, and delivery.

This circuit consists of the following divisions: managing signals from the sensors, the switches, and the main unit; driving the motors, the solenoid, and the clutch; the CPU and associated circuits.
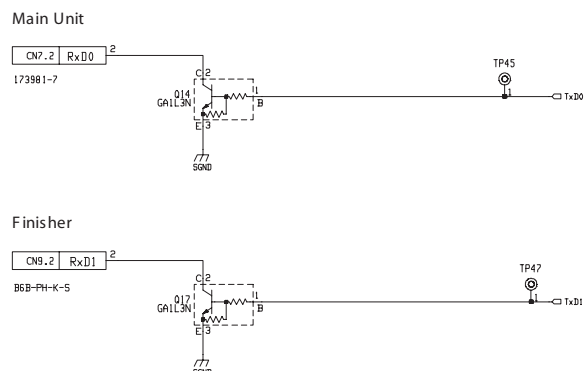
B. Circuit Detail

(1) Communication Circuit

1) TxD signal

Main Unit
CN7.1 TxD0
173981-7

+5V RK73K1JTD1KJ R22 1K
+5V
R24 1K
RK73K1JTD1KJ
K 3 DCC010 DA1
A 1
C51 100pF GRM1B82C1H101JA01
SGND SGND
IC12.5 ACL HD74LV14AFP
TP42
RxD0

Finisher
CN9.1 TxD1
B6B-PH-K-S

+5V RK73K1JTD1KJ R93 1K
+5V
R98 1K
RK73K1JTD1KJ
K 3 DCC010 DA5
A 1
C70 100pF GRM1B82C1H101JA01
SGND SGND
IC12.6 HD74LV14AFP
TP49
RxD1

2) RxD signal

Main Unit
CN7.2 RxD0
173981-7

Q14 GA1L3N
C2
E3
SGND
TP45
TxD0

Finisher
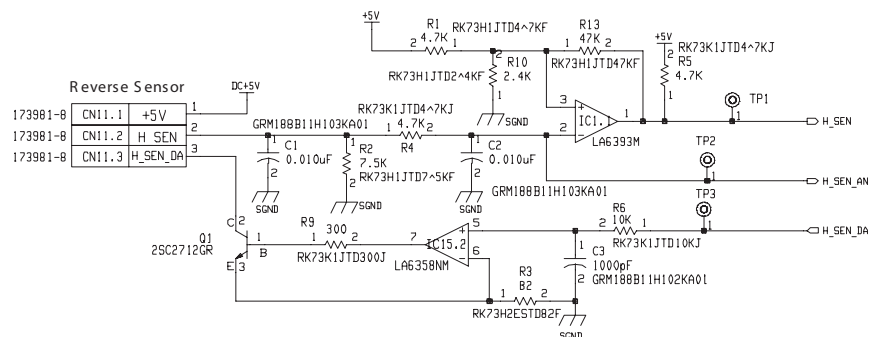CN9.2 RxD1
B6B-PH-K-5

Q17 GA1L3N
C2
E3
SGND
TP47
TxD1

This circuit communicates with the main unit and the finisher.

TxD0 and TxD1 are data signals transmitted from the main unit and the finisher to the inserter. RxD0 and RxD1 are data signals transmitted from the inserter to the main unit and the finisher. Logical 1 is represented by +5V, and logical 0 is represented by 0V.

(2) Sensor Input Circuits

1) Reverse Sensor (H_SEN)

Reverse Sensor
173981-8 CN11.1 +5V
173981-8 CN11.2 H_SEN
173981-8 CN11.3 H_SEN_DA

DC+5V
C1 0.010uF GRM188B11H103KA01
SGND
R2 7.5K RK73H1JTD7^5KF
SGND
R4 4.7K RK73K1JTD4^7KJ
C2 0.010uF GRM188B11H103KA01
SGND

+5V R1 4.7K RK73H1JTD4^7KF
R13 47K RK73H1JTD47KF
R10 2.4K RK73H1JTD2^4KF
+5V R5 4.7K RK73K1JTD4^7KJ
SGND
IC1.1 LA6393M
TP1
H_SEN
TP2
H_SEN_AN

Q1 2SC2712GR
C2
B
E3
R9 300 RK73K1JTD300J
IC15.2 LA6358NM
R3 82 RK73H2ESTD82F
SGND
R6 10K RK73K1JTD10KJ
C3 1000pF GRM188B11H102KA01
TP3
H_SEN_DA

H_SEN uses the reflective sensor integrated with an LED and a phototransistor.

The sensor detects a sheet between the sensor and the opposite reflector interrupting the light path.
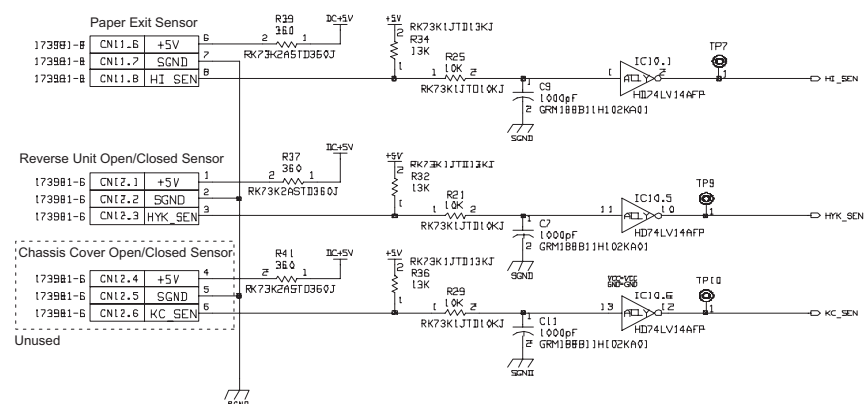
The CPU (IC6-Pin94, 95, 96) output is transmitted to the sensor to light the LED through the D/A converter (IC13), the operational amplifier (IC15.2), and the transistor (Q1). Meanwhile the signal is transmitted to the CPU (IC6-Pin30) through the noise filters (R4, C2) and the comparator (IC1.1).

The signal input to the CPU follows the logic: "H" when a sheet is detected, "L" when not detected.

The analog signal is transmitted to CPU (IC-Pin105) through no comparator.

R1 and R10 divide the +5V voltage which is applied to the comparator as the reference voltage.

R13 is used to make the reference voltage have hysteresis.

Paper Exit Sensor
173981-8 CN11.6 +5V
173981-8 CN11.7 SGND
173981-8 CN11.8 HI_SEN

R19 360 RK73K2A5TD360J
DC+5V
+5V R34 13K RK73K1JTD13KJ
R25 10K RK73K1JTD10KJ
C9 1000pF GRM188B11H102KA01
SGND
IC10.1 ACL HD74LV14AFP
TP7
HI_SEN

Reverse Unit Open/Closed Sensor
173981-6 CN12.1 +5V
173981-6 CN12.2 SGND
173981-6 CN12.3 HYK_SEN

R37 360 RK73K2A5TD360J
IC+5V
+5V R32 13K RK73K1JTD13KJ
R21 10K RK73K1JTD10KJ
C7 1000pF GRM188B11H102KA01
SGND
IC10.5 ACL HD74LV14AFP
TP9
HYK_SEN

Chassis Cover Open/Closed Sensor
173981-6 CN12.4 +5V
173981-6 CN12.5 SGND
173981-6 CN12.6 KC_SEN
Unused

R41 360 RK73K2A5TD360J
IC+5V
+5V R36 13K RK73K1JTD13KJ
R29 10K RK73K1JTD10KJ
C11 1000pF GRM188B11H102KA01
SGND
IC10.6 ACL HD74LV14AFP
TP10
KC_SEN

SGND

2) Paper Exit Sensor (HI_SEN)

HI_SEN uses the photointerrupter integrated with an LED and a phototransistor.

The sensor detects a sheet with the lever actuator interrupting the light path of the photointerrupter.

The signal is transmitted to the CPU (IC6-Pin106) through the noise filters (R25, C9).

The signal input to the CPU follow the logic: "L" when a sheet is detected, "H" when not detected.

R39 is a current limiting resistor for the LED. R34 is a load resistor for the sensor.
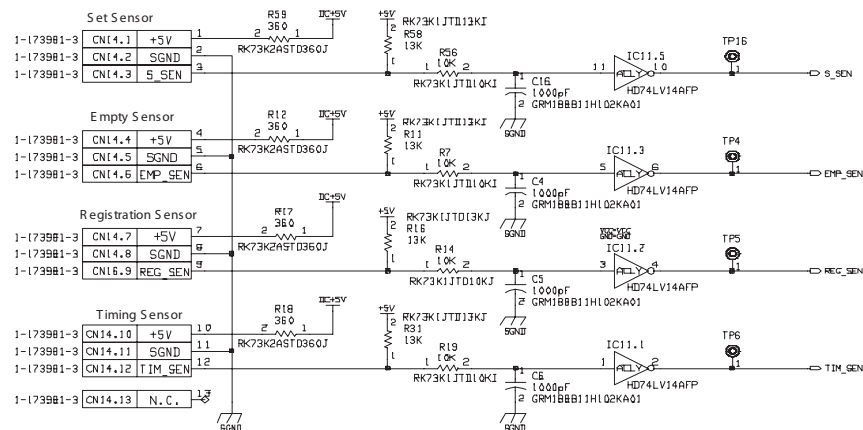
3) Reverse Unit Open/Closed Sensor (HYK_SEN)

HYK_SEN uses the photointerrupter integrated with an LED and a phototransistor.

The sensor detects state of the reverse unit with the lever actuator interrupting the light path of the photointerrupter.

The signal is transmitted to the CPU (IC6-Pin108) through the noise filters (R21,C7).

The signal input to the CPU follows the logic: "L" when the reverse unit is open, "H" when closed.

R37 is a current limiting resistor for the LED. R32 is a load resistor for the sensor.

4) Set Sensor (S_SEN)

S_SEN uses the photointerrupter integrated with an LED and a phototransistor.

The sensor detects the main unit with the lever actuator interrupting the light path.

The signal is transmitted to the CPU (IC6-Pin2) through the noise filters (R56,C16).

The signal input to the CPU follows the logic: "H" when the inserter is connected to the main unit, "L" when not connected.

R59 is a current limiting resistor for the LED. R58 is a load resistor for the sensor.

5) Empty Sensor (EMP_SEN)

EMP_SEN uses the photointerrupter including the LED and the phototransistor in one unit.

The sensor detects a sheet with the lever actuator interrupting the light path.

The signal is transmitted to the CPU (IC6-Pin31) through the noise filters (R7,C4).

The signal input to the CPU is the following logic: the signal is "H" when a sheet is detected, "L" when not detected.

R12 is the current limiting resistor for the LED. R11 is the load resistor for the sensor.
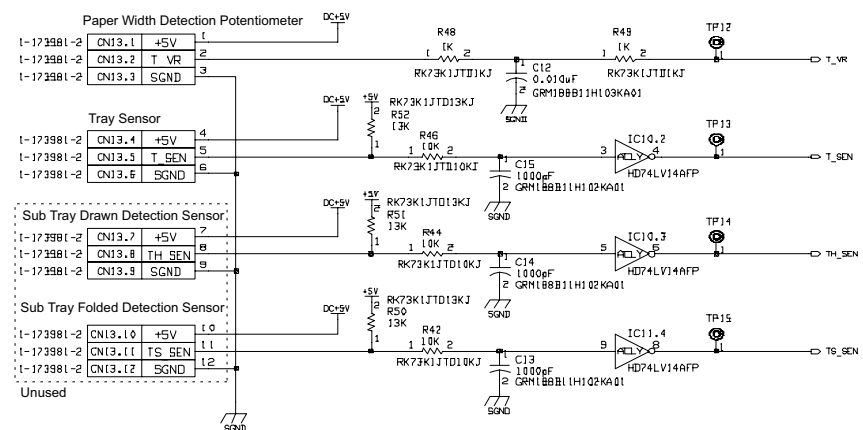
6) Registration Sensor (REG_SEN)

REG_SEN uses the photointerrupter integrated with an LED and a phototransistor.

The sensor detects a sheet with the lever actuator interrupting the light path.

The signal is transmitted to the CPU (IC6-Pin32) through the noise filters (R14,C5).

The signal input to the CPU follows the logic: "L" when a sheet is detected, "H" when not detected.

R17 is a current limiting resistor for the LED. R16 is a load resistor for the sensor.

7) Timing Sensor (TIM_SEN)

TIM_SEN uses the photointerrupter integrated with an LED and a phototransistor.

The sensor detects a sheet with the lever actuator interrupting the light path.

The signal is transmitted to the CPU (IC6-Pin33) through the noise filters (R19,C6).

The signal input to the CPU follows the logic: "L" when a sheet is detected, "H" when not detected.

R18 is a current limiting resistor for the LED. R31 is a load resistor for the sensor.

8) Paper Width Detection Potentiometer (T_VR)

T_VR is a potentiometer.

The paper width is detected using the output voltage, which may vary depending on the potentiometer's knob position.

The signal is transmitted to the CPU (IC6-Pin112) through the noise filters (R48,C12).

9) Tray Sensor (T_SEN)

T_SEN uses the photointerrupter integrated with an LED and a phototransistor.

The sensor detects a sheet with the lever actuator interrupting the light path.

The signal is transmitted to the CPU (IC6-Pin126) through the noise filters (R46,C15).

The signal input to the CPU follows the logic: "L" when a sheet is detected, "H" when not detected.

R52 is a load resistor for the sensor.

10) JAM Cover Open/Closed Switch (JCK_SW)

JCK_SW is the JAM cover open/closed detection switch using the microswitch.

+24V is supplied to the switch. The contacts open when the JAM cover is open.

When the switch turns on, +24V voltage is applied to the cathode of ZD2, the base current flows to Q12, and Q12 turns on to transmit the signal to the CPU (IC6-Pin111).

The signal is also used as the +24V conduction signal simultaneously.

The signal input to the CPU follows the logic: "H" when the JAM cover is open, "L" when closed.

The +24V conduction signal follows the logic: "L" when the +24V voltage is conducted.
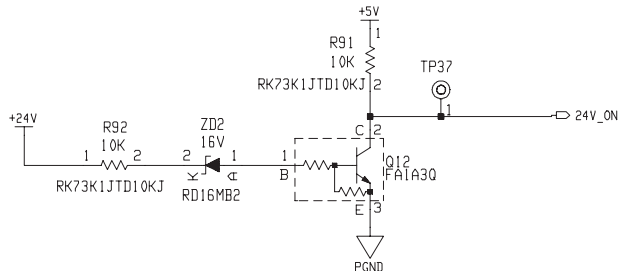
(3) Motor Drive Circuits
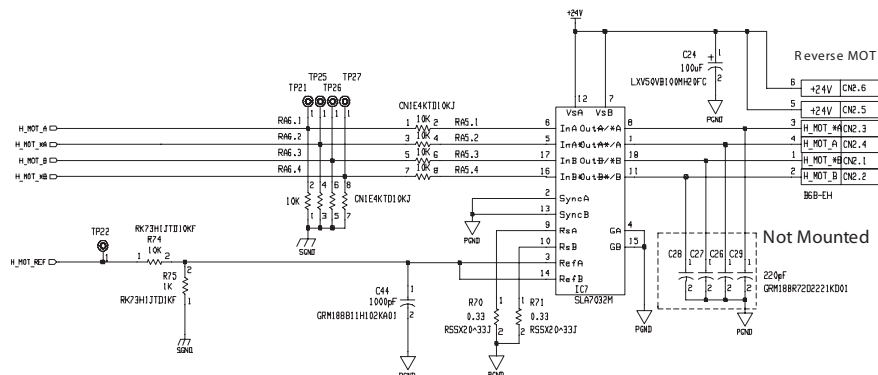
1) Paper Feed Motor Drive Circuit (K_MOT)
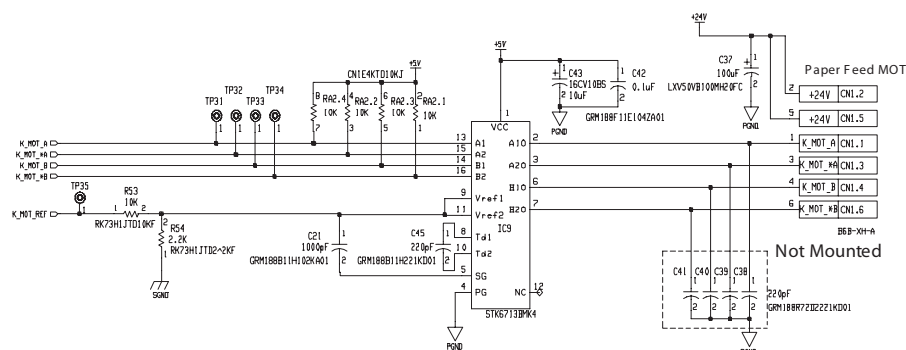
This circuit rotates/stops K_MOT and controls its rotational direction and the motor current. The circuit consists of the CPU (IC6), the D/A converter (IC13), the constant-current chopper driver IC (IC9), and other elements.

The signals of the stepping-motor drive excitation pattern from the CPU (IC6-Pin37,38,70,71) control the motor rotation speed and rotational direction.

The analog signal from the D/A converter (IC13-Pin11) is divided into the constant voltage by R53 and R54. The divided voltage is applied to IC9-Pin9,11 to set the motor current.
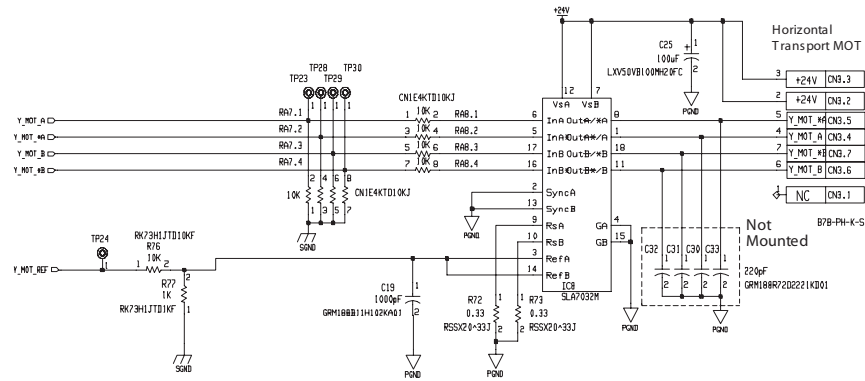
2) Reverse Motor Drive Circuit (H_MOT)

This circuit rotates/stops H_MOT and controls its rotational direction and the motor current. The circuit consists of the CPU (IC6), the D/A converter (IC13), the constant-current chopper driver IC (IC7), and other elements.

The signals of the stepping-motor drive excitation pattern from the CPU (IC6-Pin118, 120, 121, 122) control the motor rotation speed and rotational direction.

The analog signal from the D/A converter (IC13-Pin5) is divided into the constant voltage by R74 and R75. The divided voltage is applied to IC7-Pin3,14 to set the motor current.

3) Transport Motor Drive Circuit (Y_MOT)

This circuit rotates/stops Y_MOT and controls its rotational direction and the motor current. The circuit consists of the CPU (IC6), the D/A converter (IC13), the constant-current chopper driver IC (IC8), and other elements.

The signals of the stepping-motor drive excitation pattern from the CPU (IC6-Pin97, 98, 101, 102) control the motor rotation speed and rotational direction.

The analog signal from the D/A converter (IC13-Pin6) is divided into the constant voltage by R76 and R77. The divided voltage is applied to IC8-Pin3,14 to set the motor current.

## 4) Flapper Solenoid and Registration Clutch Drive Circuit (F_SOL and R_CL)
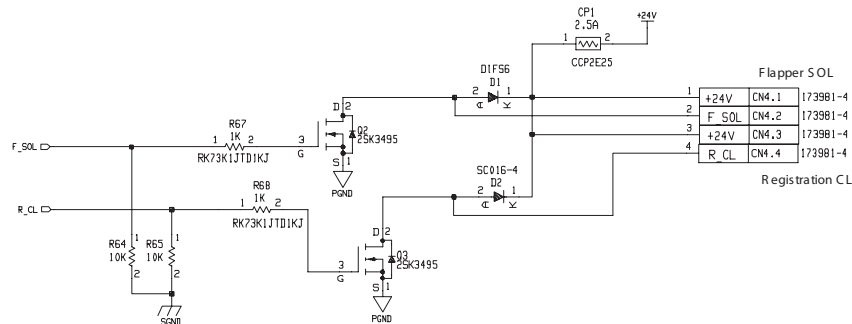
This circuit controls the flapper solenoid operation and the registration clutch engagement.

When the signal F_SOL is "H", Q2 turns on to activate the solenoid. Similarly, when the signal R_CL is "H", Q3 turns on to engage the clutch.

The flapper solenoid drive signal is the PWM signal. At the beginning of the solenoid activation, the signal is adjusted to set the solenoid at 100% duty cycle. After the plunger of the solenoid is pulled in, the signal is adjusted to set the solenoid at 70% duty cycle in order to reduce the temperature rise with the plunger hold.

5) Reset Circuit
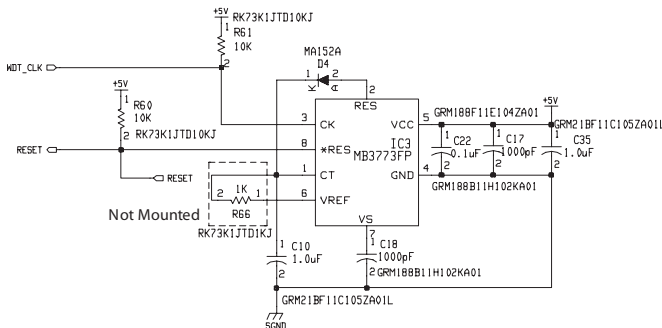
The circuit transmits a reset signal to the CPU when the power is turned on or a power brownout is detected.

The circuit includes a watchdog timer intended to the CPU system operation diagnosis.

After the power is turned on, normally IC3-Pin8 (*RES) is "H". However, when the +5V voltage falls to 4.2V or less because of the power turned off or any trouble, IC3-Pin8 turns "L" to reset the CPU.

The clock signal from the CPU is transmitted to IC3-Pin3 (CK) at a regular interval to clear the watchdog timer embedded in IC3. However, if the clock signal from the CPU disappears because of a system trouble, IC3-Pin8 turns "L" to reset the CPU and stop the system operation.

6) EEPROM Circuit
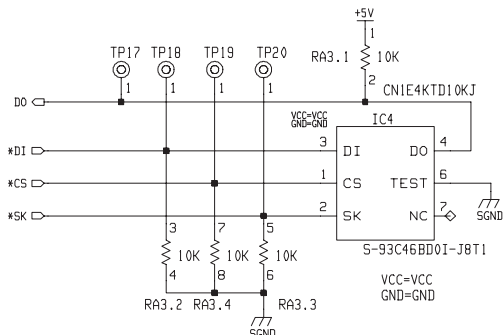
This circuit consists of the data storage EEPROM and the peripheral circuits.

IC4 is a storage memory for the adjustment settings of the reverse sensor (reflective sensor) and the paper width detection potentiometer, and passes the data to the CPU through the four-wire serial interface.

Once data is stored, the data is retained and not cleared even if the power is turned off.

IC4-Pin1 (CS) is the chip selection terminal, and stays "H" during passing data.

IC4-Pin2 (SK) is the serial clock terminal. The serial data is transmitted synchronizing with the clock signal input to the terminal
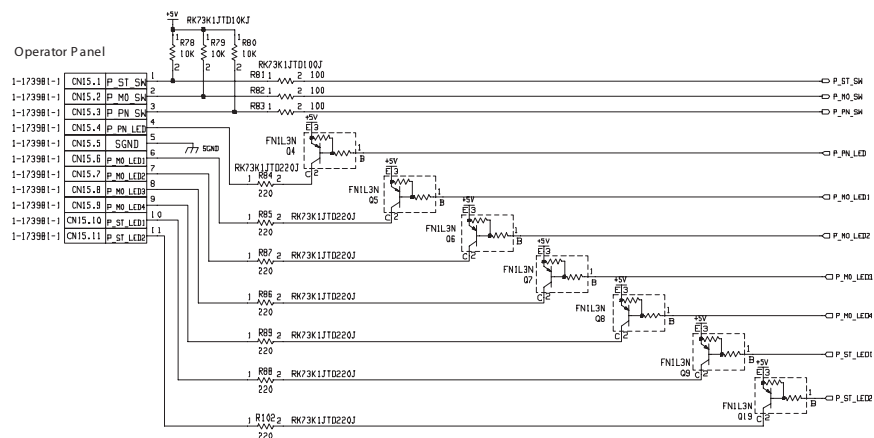
IC4-Pin3 (DI) is the serial data input terminal. IC4-Pin4 (DO) is the serial data output terminal.

7) Inrush Current Limiting Circuit

JAM cover open/closed
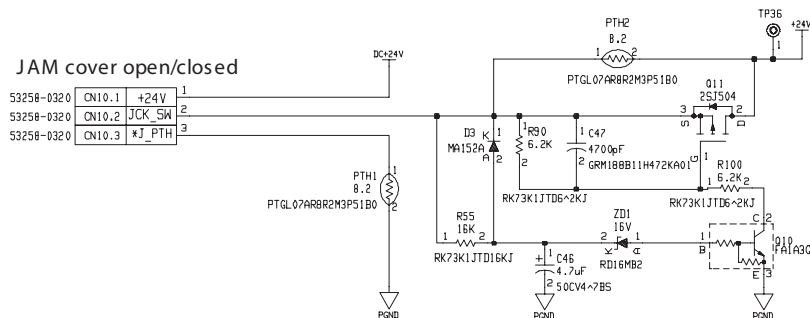
system to a certain value or less. The circuit consists of the PTC thermistor (PTH2) that limits a current and the FET (Q11) that allows a steady current flowing.

When the JAM cover open/closed detection switch is closed, the cathode voltage of ZD1 starts rising to the zener voltage according to the time constant of R55 and C46. During the rise of the cathode voltage, Q11 is off because no base current to Q10 keeps Q10 off, and then a current flows to PTH2 to charge the regeneration capacitor.

After the regeneration capacitor is fully charged, and the cathode voltage of ZD1 reaches over the zener voltage according to the time constant of R55 and C46, Q11 is turned on because the base current from ZD1 to Q10 turns Q10 on. And then the current flows to Q11 instead of PTH2 to release the current limitation. The circuit consisting of PTH1 and D3 is intended to eliminate the electric charge accumulated in C46 immediately to limit an inrush current generated by momentary opening and shutting of the cover.

8) Operator Panel Drive Circuit

This circuit includes the input circuits of the switches on the operator panel and the drive circuits of the LEDs.

The circuits connected to CN15-Pin1, 2, 3 are the input circuits of the switches on the operator panel. The input signal from the switch goes "L" when the switch is on, "H" when off.

The circuits connected to CN15-Pin4,6-11 are the drive circuits of the LEDs on the operator panel. The LED lights when the signal is "H", does not light when "L".

9) Operator Panel Circuit

This is the circuit of the operator panel board.

The operator panel drive board turns each of the LED1-6 on or off,
and detects weather each of the PSW1-3 is on or off.

LEAD-FREE SOLDER

The PWB's of this model employs lead-free solder. The "LF" marks indicated on the PWB's and the Service Manual mean "Lead-Free" solder. The alphabet following the LF mark shows the kind of lead-free solder.

Example:

Lead-Free

Solder composition code (Refer to the table at the right.)

5mm

LF a

\<Solder composition code of lead-free solder\>

Solder composition	Solder composition code
Sn-Ag-Cu	a
Sn-Ag-Bi Sn-Ag-Bi-Cu	b
Sn-Zn-Bi	z
Sn-In-Ag-Bi	i
Sn-Cu-Ni	n
Sn-Ag-Sb	s
Bi-Sn-Ag-P Bi-Sn-Ag	p

(1) NOTE FOR THE USE OF LEAD-FREE SOLDER THREAD

When repairing a lead-free solder PWB, use lead-free solder thread.

Never use conventional lead solder thread, which may cause a breakdown or an accident.

Since the melting point of lead-free solder thread is about 40°C higher than that of conventional lead solder thread, the use of the exclusive-use soldering iron is recommendable.

(2) NOTE FOR SOLDERING WORK

Since the melting point of lead-free solder is about 220°C, which is about 40°C higher than that of conventional lead solder, and its soldering capacity is inferior to conventional one, it is apt to keep the soldering iron in contact with the PWB for longer time. This may cause land separation or may exceed the heat-resistive temperature of components. Use enough care to separate the soldering iron from the PWB when completion of soldering is confirmed.

Since lead-free solder includes a greater quantity of tin, the iron tip may corrode easily. Turn ON/OFF the soldering iron power frequently.

If different-kind solder remains on the soldering iron tip, it is melted together with lead-free solder. To avoid this, clean the soldering iron tip after completion of soldering work.

If the soldering iron tip is discolored black during soldering work, clean and file the tip with steel wool or a fine filer.

CAUTION FOR BATTERY REPLACEMENT

(Danish)   ADVARSEL !
Lithiumbatteri – Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri
af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandoren.

(English)   Caution !
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type
recommended by the manufacturer.
Dispose of used batteries according to manufacturer's instructions.

(Finnish)   VAROITUS
Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan
tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden
mukaisesti.

(French)   ATTENTION
Il y a danger d'explosion s' il y a remplacement incorrect
de la batterie. Remplacer uniquement avec une batterie du
même type ou d'un type équivalent recommandé par
le constructeur.
Mettre au rebut les batteries usagées conformément aux
instructions du fabricant.

(Swedish)   VARNING
Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent
typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens
instruktion.

(German)   Achtung
Explosionsgefahr bei Verwendung inkorrekter Batterien.
Als Ersatzbatterien dürfen nur Batterien vom gleichen Typ oder
vom Hersteller empfohlene Batterien verwendet werden.
Entsorgung der gebrauchten Batterien nur nach den vom
Hersteller angegebenen Anweisungen.

* Applicable to battery-operated equipment

CAUTION FOR BATTERY DISPOSAL

(For USA, CANADA)
"BATTERY DISPOSAL"
THIS PRODUCT CONTAINS A LITHIUM PRIMARY
(MANGANESS DIOXIDE) MEMORY BACK-UP BATTERY
THAT MUST BE DISPOSED OF PROPERLY. REMOVE THE
BATTERY FROM THE PRODUCT AND CONTACT YOUR
LOCAL ENVIRONMENTAL AGENCIES FOR INFORMATION
ON RECYCLING AND DISPOSAL OPTIONS.

"TRAITEMENT DES PILES USAGÉES"
CE PRODUIT CONTIENT UNE PILE DE SAUVEGARDE DE
MÉMOIRE LITHIUM PRIMAIRE (DIOXYDE DE MANGANÈSE)
QUI DOIT ÊTRE TRAITÉE CORRECTEMENT. ENLEVEZ LA
PILE DU PRODUIT ET PRENEZ CONTACT AVEC VOTRE
AGENCE ENVIRONNEMENTALE LOCALE POUR DES
INFORMATIONS SUR LES MÉTHODES DE RECYCLAGE ET
DE TRAITEMENT.

* Applicable to battery-operated equipment

SHARP